

April 1950



# Discs seized in software wrangle

by George Black  
DISCS and documents were seized from an Oxfordshire office in a dramatic development in the rights wrangle between two software firms.

The dispute involves BL Systems, the British Leyland subsidiary, and Insight International, set up by three ex-BL employees. BL is alleging that the three are making illegal use of its own See Why manufacturing modelling package and of its customer list. The Insight people have denied the claims.

A court injunction was obtained by BL restraining Insight from exploiting its See Why knowhow, but Insight says it was happy to comply because it had no intention of doing so.

Edward Fiddy, Jonathan Bright and Mark Ehler left BL eight months ago and have set up their new business in Woodstock. A search of Insight premises, carried out in accordance with a writ, led

to various papers and discs being removed from the office, but Fiddy commented: "What they took was completely irrelevant to our software development. There was a manual I'd taken home three years ago and hadn't looked at for a couple of years at least. And there were a few old discs - but it was basically a lot of detritus."

BL's company secretary Geoffrey Parr said they were considering seeking a further order for seizures of other articles, but were waiting for a response from Insight to their inquiries before making their next move.

See Why is a simulation package used in developing models for manufacturing industry which BL has been selling in the UK and West Germany for two years and has recently launched in the US.

Parr said it was not claimed that Insight was selling See Why but that it was using it to develop its own software.

Fiddy said they were developing

a range of packages called Optik. Optik-1 was a micro operating system which would be followed by a number of management science packages including one for simulation.

"I've been in discussion with BL. It was their idea we might collaborate, but the talks came to an end. They then naively got the impression we were copying them," said Fiddy.

Insight's counsel had offered to submit the matter to an independent expert, he said, but the offer had been rejected. He denied that any customers, BL's or other, had been approached. They had a list of participants at a BL conference, but that was public information, he added.

Parr said: "We expect to encounter competition in this business, but don't expect our property to be removed from our premises."

Fiddy said: "I imagine they are frightened of the competition."

## IBM's forgotten Series 1 mini gets a new lease of life

by Andrew Thomas

IBM's forgotten system, the Series 1, has been saved from the scrapheap with the introduction of full SNA capability and more powerful hardware. The Series 1 was launched seven years ago as a "future proof" system, its "open architecture" being designed to allow new technology to be plugged in as it was developed.

But since then, Series 1 has

faded into almost total obscurity in the UK. Although popular in the US, it is the 8100 which has proved more popular with network users here. IBM refuses to say how many systems have been delivered.

The new lease of life given to the ageing mini comes at a time when practically every other minicomputer maker is offering full SNA and more sophisticated hardware. IBM-watchers see the an-

nouncement as IBM's attempt to get into a market which has been increasingly taken over by rival mini makers.

One of the reasons for the Series 1 not selling over here could be linked with its original marketing. It was sold by the general systems division (GSD) as a standalone system, because that was what they understood, even though it was designed as a network product.

As announced in 1976, the 4953 processor achieved 135 kips (thousands of instructions a second) and was limited to 64 Kbytes of main store. The 4956 launched last month manages 434 kips and can handle up to 1024 Kbytes.

But perhaps the most significant performance improvement comes with the introduction of the 4967 200 Mbyte disc store with 384 Kbytes of cache memory. According to Series 1 specialist David Hand, trials at customer sites have shown performance improvements of between 50% and 200%.

by Donald Kennett  
RACAL-MILGO has lost the last battle in a long-running patent infringement case.

The House of Lords last week refused Racal-Milgo leave to appeal against the decision in the Court of Appeal in March that the company had infringed patents owned by Codex covering a modulation technique for 9,600 bit-per-second modems.

The Court of Appeal upheld the High Court decision in 1981 that Racal should stop producing the relevant modems and hand over all stocks of them and profits made from them. But Racal director Ken Ward said last week that the company expected to negotiate with Codex a royalty to be paid on UK sales of the device. The companies had already arranged to

The UK is the only place where a patent infringement judgment has been made against Racal on the modem, which is manufactured in the US. Racal continued to sell it until last week, because of the appeals it had pending against the 1981 judgment, and Ward said he hoped the company would be selling it again in a few weeks.

"The sooner they give us a licence the sooner they'll start get-

## Cray boss slams US export licence laws

by Kevin Cahill

SERIOUS criticism of the government's export policy for computers was made by a group of financiers in San Francisco. John Carlson, president of Research, Carlson's public comments reflect concern about the same issue which was previously expressed earlier this year by the Research chairman John Carlson.

Carlson told his audience that it was "so frustrating to have to go to the government... now that we have a Japanese competitor appearing."

His remarks were made at a third Japanese computer manufacturer, NEC, announced that it was going to produce a standard supercomputer.

Carlson indicated that Cray was facing its toughest competition from the Japanese in Europe, where both Hitachi and Fujitsu have already made presentations of their vector processors, although delivery of the machines is not expected before early next year.

Last year Cray's annual profits were severely affected by failure to obtain export licences for two Cray 1 computers ordered

MOORE... Intel will sustain its recovery.

## Intel expects \$1 bn sales this quarter

by Kevin Cahill

CHAIRMAN of key US semiconductor manufacturer Intel, Gordon Moore, said that the company would pass \$1 billion in sales this quarter.

Adding fuel to hopes of a real recovery this year, Moore told US analysts gathered in San Francisco last week that the company was on target with its sales for April and that this time, he thought Intel would be able to sustain the recovery.

He reminded his listeners that last year the first two quarters had been good but that the market had collapsed after that. He confirmed that currently lead times were "stretching out" and prices were firming in parallel with the extending backlog.

Last year Moore said that the actual demand for units had risen by 38% over the year, but prices had collapsed, particularly because of Japanese targeting of the semiconductor industry.

This year, Intel's own shipments to Japan had risen by

52% persuading Moore that if the product was right the US could compete with the Japanese in world markets.

Moore's confidence in the analysts' forecasts that Intel would move through sales of \$1 billion this fiscal year and go to \$1.4 billion next year, came as a welcome news to both his audience and the industry.

Intel is the leading US independent semiconductor manufacturer and the collapse of its profits in 1981 to \$27 million, from \$96.7 million the year before, was a rude reminder of the nature of the recession.

Forecasts for this year's profits are \$61 million and for 1984 \$120 million.

Unlike the ranked number two, National Semiconductor, which has shed over 5,000 employees worldwide during the recession, Intel opted instead for pay cuts and an overtime ban.

Moore reckoned that this was a justified approach.



ROLLWAGEN... Privately concerned.

the nationalised French electricity generating board.

Cray Research has sold a total of 16 computers for the year 1983, four to France. One of the French machines which failed to get an export licence last year, has now been delivered, but some of the most enthusiastic meetings held by the Japanese have been in France, where Cray now sees itself seriously threatened if there are further licence hold-ups.

## UK set for 16-bit micro lead

by John Kavanagh

A UK FIRM is aiming to set the pace in the 16-bit microcomputer market by being one of the first manufacturers to build a system based on Intel's latest iAPX186 processor chip.

Business minicomputer manufacturer ABS Computers expects to sell 36,000 of the systems in the first 18 months - and it is preparing to take the machine to the US after the UK launch next month.

With its MX business minicomputer range it sells through software houses and directly to users. But the new system will be sold only through distributors. ABS expects to have six UK distributors by mid-July and is lining up other

outlets on the continent. "We're not joining the 8086 race but leapfrogging the technology," said managing director John Elsdon. "At the same time there are very few 186s available yet so our machine can also use the 8086. Some of our first batch have 186s and the others have 8086s. It is simply a case of having a different board."

"We are going with both because if we wait for Intel we could be faced with 186-based machines from the US. This way we are covered whatever happens."

The 186 is a more powerful version of Intel's 8086 processor that integrates most support functions on the one chip. This brings the component cost down while increasing system performance.



ELSDON... "We are leapfrogging the technology."

Elsdon said the product would offer "probably the best price-performance available". Features such as eight terminal sockets were built in, so the product could act as a multi-user system without the need for external networking.

The microcomputer will be offered with Digital Research's MP/M-86 and CP/M-86 operating

systems. Other systems such as Unix will be made available as they establish themselves, or depending on demand.

Elsdon said the machine had a "very unusual, very exciting" physical design which made it extremely attractive to users. It was designed totally in the UK by ABS.

## 500 Irish jobs axed by AT&T

US GIANT AT&T has axed 500 jobs at its Republic of Ireland subsidiary Telecton, but says it is committed to the firm as "a very important part" of its overseas business.

The move comes just weeks after AT&T took up an option to increase its shareholding from 45% to 75%. The Telecton workforce is being cut by two-thirds to 230.

AT&T International said sales of Telecton's products - radio communications systems - had dropped off over the last 18 months because of the recession.

But the Irish government's Industrial Development Authority said: "What sort of company would take up its shareholding option and then run the business down? We have offered help with marketing and development funds and have suggested taking on subcontract work."

AT&T replied: "We think very highly of the IDA and we are willing to work with them on any suggestions. But their ideas are for the long term; we have short-term problems."

## Round one to DEC in piracy suit

DIGITAL Equipment seems to have won the first round of its software piracy case against the UK systems house Darkcrest in the High Court last week - although Darkcrest saw the result as a stalemate.

Darkcrest was trying to force the US giant to prove its software piracy claims. But Justice Goulding granted DEC's order restraining Darkcrest from infringing DEC software copyright and passing itself off as a DEC OEM. The judge said DEC had invested "considerable amounts of money" in software and "its protection was of great importance".

Darkcrest's request for the discharge of an order allowing DEC to search its premises was held over until the full trial of the copyright infringement claim. That case is not expected to be heard until next year.

Darkcrest had claimed DEC was bringing the case for purely business reasons. And if DEC won on that basis it was preparing to take it to the EEC with restraint of trade claims.

## Telecom is using Finnish viewdata

by Donald Kennett

BRITISH TELECOM has confirmed that it is using the Finnish Miel viewdata software as the basis for the interactive data services it is developing for wideband cable networks.

Although it invented viewdata, and subsequently spent an estimated £20 million on developing it in the form of the Prestel service, BT found that when it came to adapting a system for use on a local instead of a national scale and over a different type of communications medium, it was easier to pick a smaller and less cumbersome system which had fewer people with an interest in what was done to it.

The Finnish system also runs on Digital Equipment minicomputers, rather than the less popular GEC minis on which Prestel is based. It is distributed in the UK as a corporate viewdata system by London-based AVS Intext.

The development team at BT's Martlesham research laboratory had finished the specification of the equipment for the prototype cable network "head-end" system to support interactive information services, and it is working on the software to interface one part of the system to another. It aims to demonstrate the system at a cable television and satellite broadcasting exhibition in September, with a trial system installed in the

Martlesham area by the end of the year.

Early next year BT wants to have a system running independently of the laboratory, with services including access to video-quality still pictures.

An Ethernet local area network is used to interconnect the various subsystems, some of which are still under development and may not be used in the first trial networks.

The subsystems at Martlesham include a video switch for video telephone services, a "joke box" for video disc based films and educational programmes which can be frozen or re-run in slow motion under user control, a message concentrator, a management centre, a videotex (viewdata) server with gateways to external services such as Prestel as well as its own database of local information, and a still-picture server accessible through the videotex server but run on a separate processor.

In BT's multi-star network configuration, one head-end system is designed to serve up to 60,000 subscribers via as many as 300 wideband switches under the street. It is claimed to combine the best features of both tree-and-branch and switched star networks by gaining the savings in shared trunks of the first and the flexibility of the second without overprovision of bandwidth at either end.

## Consultants start on DVLC changeover

by John Riley  
THE countdown to the launch of the Driver and Vehicle Licensing Centre's new online system starts next Monday.

The management and computer consultancy Atkins Planning announced a contract to supervise the changeover from an ICL batch system to an online system, widely expected to be IBM. A team from Atkins will next week begin a two-month review of the project, which it will support over the next two years.

Most of the work will be carried out by DVLC staff, and there will be support from the equipment suppliers.

A formal announcement that IBM, the only bidder left in the competition, has won the contract, thought to be worth £16 million, is expected early this summer.

"Our role is to be the eyes and ears of the DVLC project board," said Ian Buckingham, Atkins' head of management systems and computer consultancy.

"Our job is twofold, to preserve the operational continuity during the changeover, and to apply computer-based techniques to prepare for changes in the structure of the organisation."

"The size of the processing load is incredible," he explained, "with 250,000 enquiries from the public every day. The difficulty is the sheer size of the institution."

"In addition, the DVLC will be moving from a 'flow line operation', where mail goes from one person to the other and finally on to the computer, to a new structure where teams will handle the whole operation, gaining more job satisfaction."



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# MicroFocus aims for mainframes

by John Kavanagh  
CIBOL, specialist Micro Focus is taking its compilers and development aids into the mainframe market and planning a move into office automation with the help of over £2 million from a public share issue.

"This week the company is putting 23% of its shares on the Unlisted Securities Market, a cheaper way of raising money in the City than going for a full Stock Exchange listing."

And the City has welcomed the share placing - even though on paper it is not immediately attractive.

At a meeting of City specialists last week chairman Brian Reynolds refused to yield to pressure for a profit forecast despite the fact that the company made its first profit - £354,000 on a turnover of £4.45 million - only last year after four years of losses.

He also said the company would not pay dividends in the foreseeable future. This was unusual in the UK but standard among high-growth computing firms in the US, Reynolds said.

But City confidence is shown by the fact that 35 firms have volunteered to underwrite the share placing. This means that if there were not enough buyers the underwriters would pay Micro Focus

the minimum price of £1.55 for any unsold shares.

And Sir Timothy Hartford, a director of merchant bank Singer and Friedlander, which is sponsoring the placing, told the City specialists, "Micro Focus is by far the most fascinating computer company I am aware of in the UK or the US. There is no comparable company listed."

Co-founder and chief operating officer Paul O'Grady said Micro Focus had doubled its turnover every year since its formation in 1976 - but its growth was only just beginning.

## Leader comment - 11

"The market is becoming ripe for Cobol-based products," he said. "There are a lot of 16-bit machines around running mainstream business applications, so microcomputers are now big enough for Cobol systems."

"Microcomputer firms like Apple are aiming at big companies - companies with a huge investment in mainframe Cobol systems already. So data processing departments are coming across our products."

"Meanwhile, the IBM Personal Computer launch has had the instant effect of making micros respectable."

## Fraud defendant fires back at its accuser

by Howard Karten

PARADYNE which had been accused by the US Securities and Exchange Commission (SEC) of fraud in connection with an \$84 million social security administration contract (SSA), last week alleged that the SEC was trying to "browbeat" SSA officials into changing their stance.

In papers filed in US District Court in Tampa, seeking dismissal of SEC charges, the Florida communications and system manufacturer claimed that the director of SSA's systems engineering office was satisfied with the performance of the system Paradyne installed, and that SEC officials were aware of SSA's satisfaction. Moreover,

Paradyne's counterclaim charges SEC officials had that knowledge as late as five days before filing suit.

Paradyne officials are said to be mystified over several aspects of the SEC's case, which charged that a demonstration by Paradyne to SSA officials was a complete sham. The SEC complaint alleged that the computer Paradyne used to win the bid was nothing more than an empty case with flashing lights.

Paradyne officials are said to be puzzled about the SEC's extreme haste in moving against the company. Moreover, Paradyne officials claim, in any case no investor has been defrauded by Paradyne's actions.

## Losses in France worry government

by Jack Gee

THE staggering losses that have followed the nationalisation of France's computer and electronics industry - with the outstanding exception of Compagnie Generale d'Electricite - are causing increasing concern to the government.

Thomson-CSF has just reported a 2.2 billion Francs (£200 million) deficit, leaving its parent company Thomson-Brandt with a group operating profit of only Fr134 million (£12 million).

For Thomson-CSF, 1982 was the second loss-making year in its history following a loss of Fr180 million (£16 million) in 1981.



REYNOLDS... Exports twice pleased the Queen, now the City is with him.

improve the high-level interface for other users in other activities. With our own automated office system we could be our own gine pig for future products."

Micro Focus does over 75% of

its business overseas. The US accounts for around half its income. Its Japanese business grew from 11% of turnover to 13.5% last year, while European sales took off from almost nothing to reach 13.5%.

## French are wooed by expansive Americans

by Jack Gee

AMERICAN firms are sending signals to the French government that they want to launch or extend their operations in France.

IBM has written to the French authorities offering wider co-operation; Wang and Prime have expressed enthusiasm for co-operating with CII Honeywell Bull; and Chuck Peddle, head of Victor Technologies, said in Paris that he plans to open a factory in the South of France to build his Victor microcomputer.

The latest to join the queue is Digital Equipment. DEC's president Ken Olsen said on a recent visit to Paris that his firm might soon sign a licensing agreement with CII HB or another French

firm, or even open its own factory. Peddle, who said he would build his micro on his own or with a French partner, said: "I estimate demand in France for my machine at 100,000 units in 1987. The factory will be located in Montpellier or near Nice. I shall sign the contract in the autumn."

The American inventor added: "I will move in alone or with a French partner - CII Honeywell Bull or Jeumont Schneider."

Both French firms are known to be tempted by the prospect of an alliance with Peddle or another Californian microcomputer manufacturer.

French Minister of Industry Laurent Fabius has told Peddle that he fully approves his venture.

## Japan giant wants to lead UK offices

by Donald Kennett

JAPANESE electronics giant Matsushita is planning to assemble and later manufacture telecommunications products in the UK as part of its bid to take a leading role in this country's office automation market.

Its latest release in the UK is a facsimile receiver, which can be upgraded by adding interfaces for computers and word processors.

The transceiver, unveiled last week, will be marketed by the company's UK subsidiary Panasonic Business Equipment, which was set up in 1980 when the parent bought its UK business products distributor Teletronics. Joint managing director John Saxton, who founded Teletronics in 1966, said the company had won more than 50% of the Japanese facsimile market in only three years of selling machines, although it had made components for other companies' machines since 1945. In the UK, it has won 20% - the largest share of the market for telephone answering machines.

The UK-800 facsimile transceiver can also display the telephone number or identity code

of the machine at the other end of the link and, if further security protection is needed, a scrambler will be available in August.

The data interface available on the basic model, which costs £3,500, can be used to attach the transceiver to existing data networks and modems, while the only thing said to be holding up a direct interface for word processors is the lack of agreed standards for formatting the data.

A store-and-forward version will be available later this year which will have a five Mbyte disc drive to hold up to 20 pages and send them to any number of addresses at different times - to make use of off-peak call rates.

The five Mbyte version will cost about £10,000 and larger discs will be available. A lot of disc space is taken up for each page because it is stored as raw data so that it can be transmitted in the slower and simpler Group II format, to which no compression techniques are applied.

Lower models will be able to offer delayed transmission by using a timer and a stack of documents in the feed hopper.

## SALES BRIEF

### Logica contract is a gas

SOFTWARE giant Logica has won a contract worth almost £5 million from Holland to supply programs and hardware for modelling the flow of natural gas in pipelines. The order comes from NV Nederlandse Gasunie, which is responsible for buying natural gas in Holland, and then transporting it for export.

The system will be based on a Digital Equipment Vax computer.

### Police order

SOFTWARE Sciences, Thorn-EMI's systems house, has won a £3 million contract to supply Humberside and Kent police with a criminal information system. The project, in which the two forces are being supported by the Home Office, involves a dual Burroughs B5900 mainframe which will be interfaced to the police national computer at Hendon.

### BT buys local

UK NETWORK specialist Digital Microsystems has picked up a £1.9 million order from British Telecom for 96 HINet systems. The company has sold 216 local area network systems to BT, for a total £4 million.

Some of the HINets are linked to central IBM and ICL mainframes to give regional offices access to accounting information. Others are used locally by engineers for recording faults on telephone lines.

### Wang's biggest

WANG Last week received the firm's largest order to date: A \$20 million contract from the American manufacturing giant General Electric for Wang VS, OIS and professional computer systems. GE already is said to have an installed base of Wang hardware worth around \$30 million. The Wang hardware ordered last week will be delivered over the coming year, for use in GE facilities around the country.

### Newbury standard

ADDS, the micro making subsidiary of the US computer giant NCR, has decided to standardise on matrix printers made by Newbury Laboratories for its systems. The first year's contract is worth £250,000 and covers a range of printers from the 8510 80 column 125 cps, to the 8925, a near letter quality printer.

### Veterans deal

ONE of Europe's oldest computer companies, Nixdorf of Germany, has won an order from one of the UK's oldest printing groups, Premier Metropolis. The computer to be supplied is a Nixdorf 8870 for payroll and ledger applications, and replaces a VRC magnetic stripe ledger card system.

### It's all Irish

A DUBLIN communications company has been chosen to supply £1 million worth of digital multiplexers to the Irish Department of Posts & Telegraphs for the national digital transmission network. Cornet will make the equipment, which is designed by the French company SAT, at its Dublin factory.

### Air-to-air unit

DEFENCE equipment specialist Base Ten Systems has won a £2.5 million contract from the RAF to develop an air-to-air missile control unit for the CR1 fighter plane. Base Ten also supplies stores management systems for European fighters, and recently received a contract from British Aerospace.

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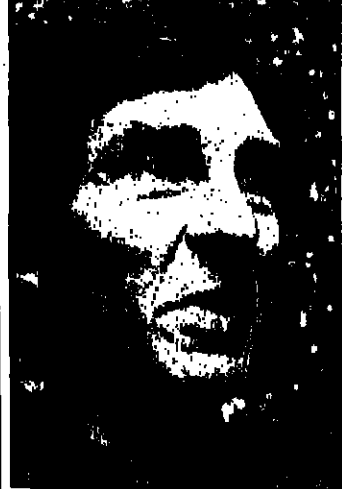
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April 15/83



John Riley reports from the International Data Corporation briefing held in London last week

# DP departments are losing control

"COMPUTER fleet management" could be one solution for DP managers who are losing control of computer acquisition in large companies, claimed Harry Henry, vice-president of marketing with International Data Corporation (IDC).

Speaking last week of the large American company experience, Henry said that as micros become cheaper they are being bought outside traditional DP budgets and used in an unco-ordinated way. An IDC sample of 500 top US companies revealed that one micro in five ends up in a large company but only 15% have been acquired under DP department control.

Increasingly, managers who have acquired micros only contact the DP department when there are problems, causing DP departments to spend much more time training. "Instead of worrying

about machines, DP managers are now having to worry about people," said Henry.

To regain or keep control over microcomputer management in large companies, DP managers in the US are setting up user liaison departments, to guide and cultivate users towards certain machines, and provide training. There is also a trend towards computer fleet management and bulk buying by DP departments, and more intimate involvement in corporate planning.

Henry predicts an increasing return to DP departments by managers after their initial experiments with micros. "After playing with them, managers will see it's not easy, that they involve too much valuable time, and that the old stacks of paper are being replaced by stacks of floppies," he said. "To use the power of the micro

they will go back to DP departments because of the need to interact and to get at databases. We will see more of this."

DP departments are also facing other problems, warned Henry. "Eventually accountants will add up the micros obtained in other departments and subtract them from the DP budget. Increasingly DP managers are having to manage distributed resources, and if micros end up becoming terminals in the future there will be demands for more processing power to handle them. Finally, there is always the lurking fear that other departments will take over from the DP department."

However, Henry predicts that DP departments will regain more control of microcomputer acquisition and expects them to acquire 35% of micros in large companies by 1987.



HENRY... "Micros are being used in an unco-ordinated way."

## Software and services must change to survive

BUREAUX services and the custom software industry will have to restructure to survive, warned a top US market analyst last week.

After years of rapid growth, both areas are feeling the pinch, with specialisation and diversification now the keys to survival.

This was the message from Pons Kuyper, IDC's European analyst at his company's annual UK briefing last week. He drew attention to the turmoil in the traditionally secure software industry. He attributes the changing scene to the proliferation of microcomputers in businesses and the increased cost consciousness of companies.

"The proliferation of minis and micros in user departments is hitting processing services suppliers, which are still predominantly geared towards centralised computing," he explained. "Within Western Europe processing as a percentage of the total software and services market has slipped from 55% in 1978 to 47% in 1982."

While the outlook is gloomy for local batch processing (such as

payroll) there are opportunities in remote problem solving (for instance in cataloguing and listing services).

Opportunities arise especially in remote autotransaction - material requirements planning; and in interactive remote autotransaction, such as invoicing and electronic funds transfer.

Traditional custom software is being hit by the rapid growth in packaged software. "By 1987 the packaged software market will be three times the size of the custom software/consultancy market," predicts Kuyper.

However, there will still be growth of 11% per annum till 1987 in custom software but this will be increasingly in specialised areas.

Two areas are expanding fast, packaged software and systems houses (ie OEMs). "Both will continue to benefit from the phenomenal growth in the microcomputer sector, where the installed base for business applications in Western Europe is expected to rise from 251,000 in 1981 to 2,846,000 in 1987," Kuyper said.

## Is an IBM System 36 coming?

IBM's System 38 will evolve as the company's middle of the road medium sized business system, and the announcement of the "System 36" and the decline of the low end of the 4300 series are part of that strategy, predicts IBM watcher Jack Hart.

"We will see IBM pushing the System 38 as the mainstream processor, and the company will try to wean System 34 users on to it via the System 36, which may be a temporary measure," said Hart. He expects the 36 to be System 34 compatible, running on RPG II,

and not needing air conditioning.

He expects IBM to replace the ageing 303X series of mainframes and fill the gap between the 4341-12 and the 3083R. "There will also be activity in the high end performance Mips race in 1983," thinks Hart.

"IBM has achieved leadership in the general purpose mips race, and although new players like Trilogy are working in the background, IBM won't give that prestige end of the market away."

There will be moves towards integration of text, data, voice and

images this year, believes Hart.

Other predictions for 1983 include a continued trend towards purchase only (away from rental), competitive pricing with major discounts, and an expansion of the ORB programme to include systems.

Hart also sees shorter product life cycles, more long-haul communications activity and fault tolerant introductions which will keep machines running when they break down so that they can be repaired more conveniently.

## Wiltshire VLSI firm gets cash

by Andrew Thomas  
A WILTSHIRE chip design firm has almost £600,000 better off this week following 12 months of negotiations for venture capital. Mesbury based Silicon Microsystems began trading two years ago and hopes to establish itself as a key supplier of VLSI design services by the end of the year.

The cash comes from the Bristol Technology Group and the Industrial & Commercial Finance Corporation, which both came up with £150,000, plus a grant of £130,000 from the Department of Industry.

The rest came from the directors and employees of SMS, who put up the original money to get the company off the ground. "For the first four years we've been running on what the Americans call sweat money," says managing director Bill Morris. "It could have got the money for our expansion quicker, but the reason meant that the market was depressed and there would have been little point in borrowing large sums of money."

"So we looked for venture capital rather than a loan, and chose the BTG and ICF - they're the people we wanted to run with."

Both Morris and fellow founder, technical director James Compton worked at the Wiltshire Microelectronics Unit at the University of Edinburgh, where Morris was deputy director.

SMS currently has four designers, but boasts some 50 man-years experience in chip design. The planned expansion will raise the headcount to 15 by the end of the year, and to over 30 by the end of 1984.

## Software File Micro package transfers to new generation

THE Bristol Software Factory is about to transfer its successful Silicon Office package on to the new generation of microcomputers.

Versions of the system, which comprises a database manager, word processor and high level language, are being created for the Sirius and the IBM PC, it was revealed this week.

The product for the ACT Sirius/DRG Victor machines is ready now, and adaptation for the IBM Personal is expected to take about another eight weeks.

The Bristol company is aiming to cash in on the 16-bit boom, boosting its revenue from £1 to £2 million this year. There are plans to open an office in Washington in July. And the National Computing Centre intends to run three-day induction courses for the Silicon Office in London and Manchester this summer.

The Factory is a partnership of three men: John Kyle-Price and Dick Dennett, who together run an OBM operation based on South-West Technical Products and ex-Commodore software manager Mike Whitehead. They set up as the Bristol Computer Centre, but sold out and re-started as the Factory in June 1980.

Kyle-Price and Dennett were writing Basic accounts packages for the Commodore Pet. Then they switched to development of a records management system called OZZ, working in machine code. With Commodore's introduction of the 8096 machine, that idea was taken forward to become 27,000 lines of assembler under the title of the Silicon Office.

"It hadn't been possible to do anything like this before for lack of space. The program took up 60K out of 96K available," said sales manager Mike McDonald.

He began to promote the package to Commodore dealers in late 1981, and some 3,000 units were sold in the UK in 15 months. Much of the success, he says, was due to attractive presentation and clear, simple documentation.

The software was protected from piracy by making the floppy discs uncopyable. Last year the package was taken over to the US and sold a further 1,500 units.

"It was ticking over very nicely on Commodore hardware, but we were concerned about the future because we felt Commodore would move back towards the domestic market," said McDonald.

They plumped for developing an Intel 8086/8-chip version and are now happy that they did. They have produced their own set of 15 replacement keypads for special functions, adapting the Sirius keyboard for word processing. The Sirius version is protected by a hardware device, or dongle, in place of the software technique that made discs uncopyable. The number of commands has been cut from 36 to 18 and documentation is slimmed down.

McDonald claims the Sirius package is five times easier to use than the Commodore one, as well as five times more powerful. It takes up 130K of memory and will not run in less than 256K total.

McDonald... "Five times easier to use."

## Lawyers examine their own case for using IT

by Nuala Moran

THE National Law Library, the research and development arm of the legal profession in the UK, is looking at ways in which information technology can be used to protect solicitors' monopoly in conveying. This is part of a study of the use of information technology in lawyers' work.

It will also consider how to finance investment in this area in view of the financial regime in law partnerships.

Consultants Coopers and Lybrand Associates is to conduct the study. Funding for the £100,000 project will come in part from the Department of Industry, with contributions from publishers and suppliers of office technology.

These include ICL, IBM, Plessey Office Systems, Rank Xerox and British Olivetti, which are helping to find out what is holding up lawyers in taking up equipment which is currently available and what new facilities might be required by the market.

Conveyancing provides most of solicitors' income, and how that monopoly is threatened by the rest. The overall aim is to promote the applications of satellite collected data for UK industry.

"We are looking for a bat-on-of-half processor which will process digitised images 100 km wide by 4000 km long with a resolution of 25 metres collected for 15 minutes to each 100. The processing has to be done in the remaining 85 minutes," said Graham Davidson, manager of the National Remote Sensing Centre at Farnborough.

London Law Research has installed a direct telecommunications link to the database and is using Teletext VDU's, which store questions on screen and input to Expertise in block mode so as to keep computer connect time to a minimum.

Software File is compiled by George Black



BARNES... "Saving £6 million" by combining two languages in one project.

## UK £9m project gives Ada a Chill

A £9 MILLION project to develop a Chill and Ada programming support environment ("Chapse") is being undertaken by a UK consortium, it was revealed last week.

The 4½-year job is being funded by British Telecom, the Ministries of Defence and Industry, and others. The work is being done by the Ada Group, a consortium of ICL, Systems Designers Ltd, Programmers International and Software Sciences.

The project, which had been recommended by the Stoneman Report and by NEDO, is to put the new software on to ICL's 2900 series mainframes and on to DEC's Vax minicomputers. Chill, a computer language for telecommunications, is used widely by British Telecom.

The development of the telecommunications and defence software goes beyond work under way for the American Department of Defence of the BBC's Apse plan in its combination of the two languages in one system. It is separately funded from the Alvey programme, which is also to be involved with fifth generation software engineering.

Ada Group chairman, ICL's Martin Jordan, said they had gained an advantage over international competitors by coming late into the field, which gave time for

Ada to gain stability. "We're keen to promote this as a British initiative and believe we can gain substantial exports and port it on to other machines," he said.

He expected a compiler would be completed by 1985 and the complete environment some two years later.

The US Ada projects at Softech and Intermetrics were reporting major slippage in their timetables, he said, trying to do the development too fast under pressure from the Defence authorities. Other Ada projects are under way at Rohn, Siemens and Olivetti.

Jordan's team is 30 at present, and will build up to about 60. The Chapse plan is divided into two, Chapse or minimal Chapse, to be followed by the development of a set of software tools.

SPL's language research director John Barnes commented that combining the two languages in one project could save up to £6 million, compared to the cost of developing the two separately.

Whereas Ada, heavily backed by the US government, achieved ANSI standard status in January, Chill emerged from the international telecommunications authority CCITT, which has so far lacked the teeth to enforce standards for the language.

Ada was presented to a three-

day conference in London last week by its designers - Barnes, Robert Firth, of the Royal Military College of Science, and Alys President Jean Ichbiah.

Ichbiah said that Fortran, Cobol and PL1 had been good languages for their time, but in the Seventies the phrase "software crisis" had been coined and there was a new emphasis on the need for reliability, maintainability and readability. The concepts of software engineering and software components had emerged. This had led to the development of Algol 68, Pascal and Simula.

"We were solving easy problems but going around the difficult ones," he said.

In 1974 the American Defence Department had found its software costs were over \$3 billion a year, with some 400 languages and dialects in use; they aimed not to decrease those costs but to prevent their escalating too fast. They wanted to improve programming tools and the average qualifications of programmers.

The requirements for a new language were worked out in a series of reports in the Seventies.

The achievement of an ANSI standard was important because it was the first time it had been awarded to a language before compilers became available.

## Future users to get Level II Cobol

LEVEL II Cobol, the award-winning language developed by Micro Focus, is to be offered on Future Technology Systems' Series 88 16-bit microcomputer. The announcement means that applications written for mini or mainframe level machines can be moved on to the Series 88.

The Cobol compiler was certified at high level by the US government general services administration's federal compiler testing centre.

## Tom Speeds up

TOM - US software house The Office Manager - has announced enhancements to its Wang-based distributor business management system and Speed-11 application generator/database manager. TOM products are installed at some 4,000 Wang sites worldwide.

## Unix for Plessey

PLESSEY Microsystems has chosen Unix as the operating system for its Motorola-68000 chip machine, the System-68. Unix System 11, the latest Bell Labs issue, will be ported by Root Computers of London to the new micro, working with the Californian UniSoft. This Unix version, known as UniPlus+, is now on 40 68000-based micros.

## Micro agreement

MICROPRO, the proprietor of the successful WordStar word processing system, has signed a marketing agreement with Franklin Computer Corporation of New Jersey, a micro maker. WordStar will be available on Franklin's Ace hardware.

## First Friday

ASHTON-TATE, US developer of the successful database manager for micros, dBase-11, has introduced a personal information manager called Friday at the low end of the market. It is aimed at the first-time, professional user and can be used with dBase-11 or on its own.

## Into Europe

ANACOMP, the US banking applications software house, has set up a new enterprise called Anacom-HCS in collaboration with City of London-based Harrison Computer Services. The aim is to sell Anacom products in Europe. HCS has been working with Anacom for three years.

## For publishers

SOUTHDATA, the London author of the freeform database manager Superfile, is bringing in a range of application packages. The company, founded by Practical Computing former editor Peter Laurie, is to launch software for estate agents, magazine publishers, a mail-list and utility programs.

## Program upgrade

LIFEBEAT Associates, the New York micro software house, has upgraded its screen calculator program T/Maker with word processing, file management and graphics extras. T/Maker 111 runs under CP/M operating systems and can sort data alphabetically or numerically.

## Smart, Low Cost and Compatible

The Zenith Z29 - a "smart" terminal for only £595\* with competitive quantity discounts.

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● Detachable keyboard, tiltable monitor (two positions), printer port and expansion sockets for 32K RAM or ROM.  
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For more information on the Zenith Z29 terminal telephone Geoff Stone, on (0452) 26481 or write to him at Zenith Data Systems, Bristol Road, Gloucester, GL2 8EE.

Recommended Retail Price

This year the lecture was "unconventional and sometimes earthshattering", according to its presenter, Sir Kenneth Corfield, chairman of Standard Telephones and Cables (STC), which sponsored the extravaganza. Called The Photon Connection, the lecture dealt with the use of fibre optics for communication.

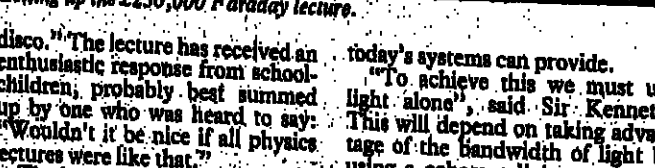
Light was the theme of the event and it played a dramatic part in its presentation. This was complemented by film, stage effects and audio visual material. Sir Kenneth admitted that he had had no schooling experience since his school days, but the rest of the panel of presenters had eight days' coaching from a professional actor.

Of course, the above makes the Photon Connection sound more like an entertainment spectacular than a lecture, and this is not misleading. However, even the most puritanical of school-teachers could not have objected to bringing the class along, as it was also a lively presentation of a complex technical subject.

As Sir Kenneth said: "We don't wish to be remembered for presenting the Faraday Lecture

today's systems can provide. "To achieve this we must use light alone," said Sir Kenneth. This will depend on taking advantage of the bandwidth of light by using a coherent light source, by regenerating signals optically and by switching light, like a telephone.

Sir Kenneth said: "When we master these techniques we shall have a resource limited only by our own imagination." The disadvantages of distance will diminish. And those of time. We will communicate anything to anyone. With the speed of light photons not electrons will connect us.



Setting up the £250,000 Faraday lecture.

## Govt to put £45 million into space software

by John Riley  
SOFTWARE houses stand to benefit from a three year, £45 million remote sensing programme announced last week by Information Technology Minister Ken Baker.

Like the recently announced Alvey money, the cash is not new, coming from existing allocations in this case the space budget. What is new is that it is earmarked for a co-ordinated remote sensing programme.

Future satellite systems will collect earth data in a new way, by digitised microwave sensing, and systems have to be created by 1987 to cope with the resulting enormous increase in data processing and transmission demands.

Several computer related companies are prominent in the field. Logica, Ferranti, Thorn EMI, Standard Telecommunications Laboratories and Marconi Communications Systems are all members of the UK Space Consortium Committee chaired by Baker.

The allocation for 1983-4 is £14 million, of which £4 million has been earmarked for 33½% grants to industry for software development relating to remote sensing.

It is likely that the main take up will be from large companies. Government research establishments will largely benefit from the rest. The overall aim is to promote the applications of satellite collected data for UK industry.

"We are looking for a bat-on-of-half processor which will process digitised images 100 km wide by 4000 km long with a resolution of 25 metres collected for 15 minutes to each 100. The processing has to be done in the remaining 85 minutes," said Graham Davidson, manager of the National Remote Sensing Centre at Farnborough.

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Financial editor Kevin Cahill discerns a new image as well as a new logo as ICL presents its mid-term report

# Why computers may one day handicap ICL

WHILE attention has focused mainly on ICL's computer activities, the company is trying to become something else.

An almost throwaway remark by Robb Wilmot when he introduced the company's new logo early this month at a presentation in London, said a lot.

According to Wilmot, the word "Computer" in the company's title might one day prove a handicap.

He didn't clarify this, but Network Systems manager Clem Jones, in his mid-term report on the state of ICL's network building activities probably said almost all his boss intended.

Jones, reporting to Aodh O'Donnell, is responsible for establishing the central hardware architecture, and attendant software for the network supplier ICL intends to become.

It's a tall order, involving the merging of ICL's Information Processing Architecture into various products, and product combinations, as well as getting the various international companies and bodies to agree message, send, receive and decide standards.

Jones, taking his cue from Wilmot, speaks of the potential Tower of Babel if standards are not agreed

soon. Companies like IBM, ITT and the various national PTTs throughout Europe have already set up standards of their own. The danger is that as the technology, now becoming both cheap and commonplace, reaches the market, the opportunity to have generally agreed common standards will be lost.

According to Jones, satisfactory progress has been made at two levels: the level of physical interconnect between devices, and the transportation level, generally now associated with the development of Ethernet.

The development of standards is sufficiently far down the line for companies like Intel, AMD, National Semiconductor and other chip suppliers to be offering the standards embedded in chips which will soon be available.

ICL is a subscriber and major definer of this standard, Ethernet, and this has led to an even faster cost reduction than ICL had originally predicted.

On the basis of a notional \$300 level of cost in 1982 for controller interface electronics, the cost of the same devices in VLSI in 1984 would be around \$40. This level of hardware cost is essential if the cost of developing software is to be

reduced, and a volume market for products developed, Jones says. By describing the eventual shape of the true open system as an hour glass, with the transport and exchange protocols at the bottom, Jones managed to show clearly where the progress of reaching agreement on international standards was slowest.

The top of the hour glass contains items like file transfer, text interchange and presentation and session operations.

Describing the lower levels as the plumbing, Jones said that this was now well under control, with ICL, supported by the Department of Industry, pursuing a national and international attempt to get standards agreed at the application level.

"It's not much use having all this communications hardware if one user of a billing system cannot mail his invoices electronically to his customer, just because his customer happens to have a different computer system," according to Jones.

The problem facing ICL and the smaller vendors is that it is not in the commercial interests of a company like IBM to share its dominant market position with other companies by giving them access

to its established user base by agreeing common protocols. But IBM is in a situation where any claims of heel dragging by the smaller European vendors are likely to lead to repercussions at the EEC, which is trying to persuade IBM to reveal sufficient details of its products in advance to enable the competition to prepare their own offerings.

Not that Jones was accusing IBM of heel dragging, directly at any rate.

While Wilmot has declared his intention of surrounding IBM mainframe with ICL kit, Jones' diagram of the ideal network shows IBM reduced to the status of single mainframe server, among others, arguing clearly that Wilmot has ambitions well beyond merely playing server to the great god of DP - IBM.

Jones hedged on a date for the full availability of an ICL total network, complete with 10 Mbyte main communications channel, but he confirmed that the delays to the Mitel device were not significantly holding up progress.

Additionally, as Wilmot noted in the course of confirming Mitel as the supplier, there were a number of other switches available besides that supplied by Mitel.



WILMOT... ICL is growing beyond computers.

## Wilmot dispels the worries

THERE was a touch of spring about ICL's most recent announcements.

For a start, they all came late, in the wake of just the kind of speculation which did so much damage to the company two years ago.

Fortunately Robb Wilmot, fresh from his long hibernation, was able to put most of the worries to flight as he demonstrated for the first time the CPUs of both the DMI and the Batriel, which ICL is developing jointly with Fujitsu of Japan.

The DMI, a two chips addition to the MB29 range is due for introduction next year, and Wilmot displayed in main CPU board, one of three - which will eventually form the heart of ICL's bid to stay centrally placed in the low end of the mainframe business.

The DMI, using 256K fast dynamic RAMs, which were shown loaded on the board but with the supplier's name obliterated, will have 16 Mbytes of main memory, and the major CPU processes will be embedded in logic arrays of 8000 gate density.

To call this advance "slightly breathtaking" is an understatement. Very few manufacturers have so far actually admitted that they will be installing such large chips, or such dense gate arrays, much before 1986 - if then. Additionally, the parentage of the chips, with their little black-finned cooling towers, is nothing if not "blue chip".

Put briefly, they are by Fujitsu, out of Amdahl Corporation, by Dr. Gene Amdahl, Nice lineage, if you can get it, and twice as fast, twice as cool as IBM's transistor to transistor logic.

Further, the semiconductor technology is widely proven, since it is the silicon emitter coupled logic which drives Fujitsu's own range of super mainframes, and Amdahl Corp's 580 range, currently enjoying an unprecedented order boom.

Perhaps even more important is that the twin projects, which at their heart are implementations of ICL's 2900 architecture, are on time, having recently passed



BIGGAM... "Germany still a disaster area."

successfully their mid-stage program points.

What Wilmot's confident presentation did was to confirm an impression, widespread in Japan, that the ICL-Fujitsu collaboration is proving one of the most successful of its kind.

Wilmot led his presentation with the Fujitsu collaboration mid-term report. This was logical, given that the other key collaboration, with Canadian telecommunications manufacturer Mitel, is delayed by nine months.

In contrast, the Fujitsu deal is on time, with enough leeway to

which need computer power to drive them, and then to proceed and build the necessary engines, within a distributed, or networked, concept.

With all the emphasis on specific hardware items, Wilmot managed almost to obscure perhaps the most crucial external connection the company has made in the marketplace. This is the deal to supply British Telecom with its Merlin range of products.

Few brokers have yet managed to get around to calculating the effect on ICL of becoming a BT supplier, but "substantial" was how Brian Newman of Spencer Thornton described it.

Substantial probably means more than £200 million within two years - which invokes an area in which Wilmot departed from his generally confident presentation.

One of the products at the bottom end of the range, the Rair PC, is generally thought to be moving slowly.

According to Wilmot the PC and its successor PC2, which has an optional 16-bit upgrade board, are targeted on the executive desk and the three or four screen user, not the Apple stand-alone marketplace.

The problem would seem to be that not enough people know about this, apart from Televison, which is launching a similar product at the NCC in the US next week, incorporating, as the PC does, hard disc.

The ICL PC is likely to be one of the Merlin products, and while Wilmot may have the right strategy, he could yet have to change his product if he is to make any real headway in the small PC market.

Fujitsu and ICL FUJITSU is to make some of the chips for the DMI to ICL's design, and part of the Batriel CPU and ICL's design. It will not build the whole of the DMI, and the whole of the Batriel CPU as stated in last week's story on this page.

Wilmot, of course, has never been a mainframe man; he is more a semiconductor, and consequently structured, thinker. His procedure at ICL - at the technical level at any rate - has been to specify requirements, mainly consisting of interconnected jobs

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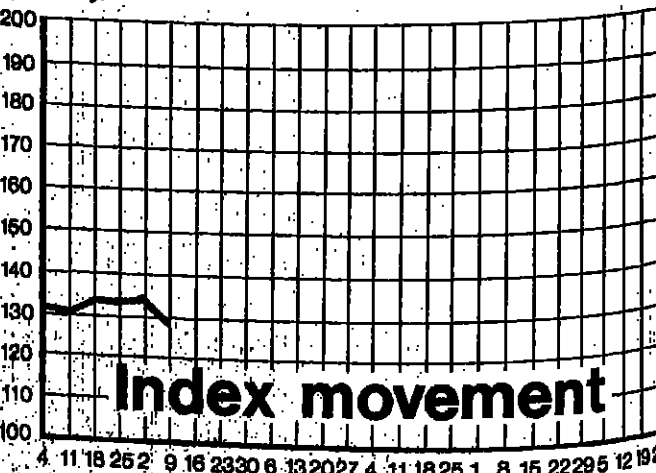
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## SHARES TABLE

The shares table, which is specially compiled for Computer Weekly, shows selected computer companies that reflect the state of the computer industry.

1983		1984		1985		1986	
High	Low	High	Low	High	Low	High	Low
220	210	230	220	240	230	250	240
230	220	240	230	250	240	260	250
240	230	250	240	260	250	270	260
250	240	260	250	270	260	280	270
260	250	270	260	280	270	290	280
270	260	280	270	290	280	300	290
280	270	290	280	300	290	310	300
290	280	300	290	310	300	320	310
300	290	310	300	320	310	330	320
310	300	320	310	330	320	340	330
320	310	330	320	340	330	350	340
330	320	340	330	350	340	360	350
340	330	350	340	360	350	370	360
350	340	360	350	370	360	380	370
360	350	370	360	380	370	390	380
370	360	380	370	390	380	400	390
380	370	390	380	400	390	410	400
390	380	400	390	410	400	420	410
400	390	410	400	420	410	430	420
410	400	420	410	430	420	440	430
420	410	430	420	440	430	450	440
430	420	440	430	450	440	460	450
440	430	450	440	460	450	470	460
450	440	460	450	470	460	480	470
460	450	470	460	480	470	490	480
470	460	480	470	490	480	500	490
480	470	490	480	500	490	510	500
490	480	500	490	510	500	520	510
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930	920	940	930	950	940	960	950
940	930	950	940	960	950	970	960
950	940	960	950	970	960	980	970
960	950	970	960	980	970	990	980
970	960	980	970	990	980	1000	990

The table shows the closing prices in London on Friday and in America on Thursday. The share prices are in pence. The index is based on the prices of the UK companies in the table. Highs and Lows have been adjusted where necessary.



# CTL's expansion isn't stopping

by Philip Hunter  
 TANDEM still dominates the market for failsafe computer systems, but its only UK rival, Computer Technology, continues to forge ahead.

Last month Information Technology Minister Kenneth Baker opened a 6,000 square foot extension to its Hemel Hempstead factory in anticipation of taking on 50 more people this year.

"Our next extension will be opened by Margaret Thatcher," brags managing director Bob Finch, perhaps letting slip his preferred victor at the coming election.

CTL is certainly in expansive mood, having taken on 104 staff in the last nine months to bring its UK force to 420. Turnover for the six months ending October 1982 was 40% up on the previous year.

Much of the growth has come from CTL's Momentum range of non-stop fault tolerant systems.

Finch says 40 have been sold since the launch in November 1982.

CTL still has difficulty in wrestling the market from Tandem, and recently lost out in the battle for a £4 million contract at National Girobank. But Finch says that only about 5% of CTL's business brings it up against Tandem.

Finch says the 50 people taken in the next year will include 20 service staff and 15 salespeople. He is also looking for people skilled in communications, but admits such a breed is hard to find.

Networking will be a key area for CTL in 1983, says Finch. "Projects like ours tend to be being networked."

CTL needs more service engineers because its factory deals with products of other companies in the parent ITL Group. This includes Office Technology, which has recently developed a word processing package called Imp.

Finch says that the recent takeover by its parent, ITL, of the UK maker of word processing systems, Data Recall, would place an added servicing burden, and was further justification for the staff increase. CTL will be servicing Data Recall's Diamond word processor.

Finch denies recent rumours that CTL will stop distributing the Convergent Technology range of microcomputers in the UK. He says that talks are however in progress to thrash out a new deal.

Convergent Technology micros are also distributed in the UK by Burroughs under the B20 label, and by NCR as under the brand name Worksave.

The US distributor TRW, which has overall world marketing rights for Convergent Technology computers, suggests that CTL might stop acting as UK distributor if new products do not accord with its marketing plans.



FINCH... Networking will be a key area for CTL this year.

## Olivetti boss sees first slide in profits

by Philip Hunter  
 FOR the first time since Carlo de Benedetti became largest shareholder and chief executive of Olivetti, the ratio of profit to turnover fell. Profits for the whole group were up 6.8% to 1103 billion lira (£47 million) on turnover up 15.7% at 13.34 trillion lira (£1.5 billion) for the year ending December 1982.

In keeping with recent years, over 90% of the overall group profit was made by the Italian parent company, which accounts for about half the overall business.

British Olivetti's overall figures have not yet been audited, but a spokesman says that sales were up 20% at about £40 million.

British Olivetti's biggest success has come from its range of computer terminals, which sold especially well to financial organisations, notably building societies in 1982.

Its electronic typewriters, which cost from £900, and can be upgraded with a 15K memory module into a simple word processing system, have also sold well.

Best seller of the company's word processing range was the 1010 screen-based model, which costs between £3,500 and £5,000 complete with electronic typewriter.

British Olivetti has not yet sold many of the microcomputers launched last autumn, but expects this to be significant in 1983.

## Sperry hits a slump

PROFITS of the US giant Sperry slumped dramatically in its year ending March 1983. They were down almost 50% from \$222 million to \$118 million, while turnover fell by 9% from \$5.57 billion to \$5.07 billion.

But most of the losses were made by the corporation's machinery products group which makes farm equipment and other capital goods.





YEARSLEY... "A classic of my type, I suppose."

## Third time lucky for one who read the signs right

RON YEARSLEY wanted to be either a vet or a politician - but is quite glad he didn't succeed at becoming either.

"I'm a classic of my type, I suppose, in that I got into computing by accident."

A grammar school boy, he studied to become a vet for four years after doing his national service in the Army. But he failed his biochemistry exams three times.

His next chosen career was politics. He canvassed for the Conservatives in Peckham in the 1959 election unsuccessfully and was the Young Conservatives' organiser for Kent and Surrey.

He planned to go to Balliol, but was turned down when they found out at the last minute that he had no Latin. So he went instead to Reading University.

by George Black

But while he was doing the two-year course a promised job fell through and he found himself at 28 in possession of a degree but no job.

With two false starts behind him - neither of which he regrets - what was he to do now, he asked the university careers office.

What about a thing called data processing, they said. He had never heard of it, but decided to give it a try and in 1962 went to join ICL as a trainee.

"I spent 10 months learning about punch cards. We learned a lot about machines, but didn't really know what they did. After three years I became a systems adviser."

He got together with Gordon Wills - now professor of marketing at Cranfield Institute of Technology - to launch a quarterly journal called *Scientific Business* (now *Management Decision*), which caught the eye of ICL's public relations people.

They made him Press Officer at Putney.

A group of ICL managers split off to form one of Britain's first computer consultancy companies, Applied Systems and Personnel (ASP), funded by Brooke Bond. Yearsley, who went with them, took charge of recruiting DP managers.

When Brooke Bond told out its interest in the venture to an American firm, in 1969, Yearsley and Roger Graham decided to join Brandon Computer Services. This

## 10 YEARS AGO

FROM COMPUTER WEEKLY OF MAY 10, 1973: Over the next five years OCR and online VDU input techniques would emerge as the main methods of data capture, with punched cards on the decline, according to a report from Fluorescence... The international banking message switching network, Swift, achieved official status in Brussels

## PLATFORM

# Putting intelligence into every home ...

This is an edited abstract of an address given to Edinburgh branch of the British Computer Society by Michael J. Aldrich, managing director of Rediffusion Computers.

COMPUTERS will remove the distinction between producers and consumers, working and living. They signal fundamental lifestyle changes that could be with us in the 1990s.

Computers and telecommunications are working to reverse the trend of the earlier industrial revolutions which caused the movement of population from the country to the towns and gave rise to the worldwide problems of commuter transportation and dormitory community isolation. Computers would allow people once again to work and live in the same community.

Teleworking, the transportation via telecommunications of office work to the worker at home will leave a residual office to be used for social encounter, task distribution, performance review, counselling and appraisal.

Teleworking does not mean that people will never go to their offices. It means that they will go less often because the basic office services of communications and recording will have been distributed to their homes. The office as we know it today as a particular conjunction of space and time will change dramatically.

There will still be factory and service workers. Some work, however automated, will always need concentrations of people. But even the factory workers will find their computer terminals waiting for them when they arrive home.

For a long time we have separated producers and consumers just as we separated working and living. It was always a false separation. A producer is invariably a consumer and a consumer is only a producer, even with our quaint economic value system.

With new telecommunications systems in our electronic house or cottage, the distinction might fade completely. The weekday factory worker might become a weekend software producer or even a handicraft producer.

The terminal in the home will bring a new era of information-based services into the home. The factory worker might decide to do some teleworking by dialling his home terminal into the local superwarehouse, ordering some goods that would be automatically picked and packed for collection or even home delivery. The worker's bank or credit card account would be automatically debited. (The banks are already planning such facilities from supermarket POS terminals).

The home terminal will also provide the electronic messages - from the plumber who is coming tomorrow to fix the central heating to the gas board which now sends the final reminders electronically before disconnecting electronically. He has his message service set up to exclude as much junk mail as possible. He can even book his spring, summer, autumn and

winter holidays from the terminal. Finally, one of the children tells him there is a new multi-media video game in the cable service (mixing audio, video and graphics with voice input/output). So they dial in, select the game Family Outcry, and play together. He loses, of course. Some things will never change.

The eldest daughter has always been good at computers. She was given her first upon her second birthday. It taught her vocabulary. Now she spends evenings and weekends, along with the rest of the fifth and sixth forms, working on computer programs for the local micro store. Her ambition is to be an information scientist. They used to be called librarians.

The local library has changed somewhat. The books are as plentiful as ever, but there is now an information centre where they used to keep the old office photocopies.

In this centre there are a dozen computer terminals in small booths, all connected into a copier/printer machine. From the terminals, one can roam the databases of the world making connections from one subject to another, printing out relevant information along the way.

The technology to do most of these things is already here. Most of the applications listed are already running in business videotex or are at the laboratory stage with multi-media devices. They will be commonplace by the end of this decade.

## DOWNTIME

## Just like the real world

IT was intended to be a simple competition, aping the real world of business - a dozen or so programming teams, each composed of three or four students, competing with each other to develop a few business programs under "real world programming" conditions of time and pressure.

The prizes: some programming books and other articles of nominal value, and the chance perhaps to learn what real world programming was about.

Everything was in readiness at La Guardia Community College in New York City: the terminals had been prepped, City University of New York's IBM mainframes had gone through maintenance the

evening before, the student problems kept under lock and key. As the problems were handed out, the students began feverishly developing their programs.

But the simulation became all too realistic. First, the 3081 crashed. Since it was the weekend, the ops staff was a skeleton crew.

When they were finally located and succeeded in bringing the system up, telecommunications problems cut off the terminals. Just like the real world, nothing was accomplished, and the programmers walked away, disgruntled.

And, again like the real world, the adrenalin-producing event has been rescheduled for another weekend.

## Another test for Sir Ranulph

GUEST speaker at the 12th annual ICP Software Awards at the Savoy Hotel was the British transatlantic expedition leader, the admirable and eloquent Sir Ranulph Fiennes. Well-chosen, no doubt, for the stimulus required to present 152 prizes to 88 companies and endure their self-backslapping, a ceremony that now consumes the best part of two hours. And he certainly shares with the winners the talent to go a long way on a little capital.

But what special insight on our

mysterious art must a celebrity possess to appear at this event, I wonder? It seems that he, at least, never worked for ICL.

Possibly it was the fact that he spent seven years getting his "spec" right before actually starting the venture which impressed the organisers.

Or perhaps it was the ingenuity he had demonstrated - as one participant pointed out - on contriving to spend the whole of 1982 year abroad.



By that time, expert systems or artificial intelligence systems will be making a commercial debut. They will extend the uses and opportunities for computers into totally new dimensions.

We are only at the beginning of the computer era. It is as if we have found and extracted iron. We have yet to realise fully what we can do with this new material.

As the myriad of new inventions and ideas tumble our way, we find difficulty in comprehension. Often we reach for the intellectual baggage of yesterday and ask who owns it or who controls it. We seem reluctant to ask who will use it and for what purpose and where is the value to our community of these new things?

We find further difficulty in dealing with technologies that are insensitive to our previous institutional dispositions and to our most cherished pecking orders.

A great new information industry is stirring, wider than computing and telecommunications, taking in publishing, television, radio, hi-fi, advertising and even news.

Most of the participants probably would not recognise they were in that industry.

And in our communities the thundering beat of the ubiquitous computer is drumming intelligence into every home appliance we use, into our cars, into our building and into our lives.

Does it matter that few people seem to have noticed?

## Pseud's Corner

"TODAY computers and robots are rapidly developing their behavioural and intellectual skills: they acquire and manipulate knowledge, take creative initiatives and modify their surroundings."



## Definitive system

BUCKINGHAM Palace garden parties are famous for their cucumber sandwiches (with the crusts cut off). Now, thanks to Mitsubishi, there is no risk that the sandwiches might contain objects other than the regal legume.

For the wily Japanese have developed an optical sensing system for sorting out objects without human intervention. According to a spokesman for the company, the system can determine an object is a fish or a cucumber.

This marvellous leap forward, which will remove all fear of faulty food from the Palace caterers, will unfortunately end a tradition started in the reign of King Henry VIII: The Royal Order of Yeoman Halibut will no longer be required to positively verify incoming food.

## Ticked off

I'M not one to look a gift horse in the mouth, but on two major launches of new computer systems I have been presented with an electronic clock, and in each case it has not worked properly. I haven't yet decided whether to equate them with the reliability of the companies' products or as their comment on journalists' erratic time-keeping.

Chad

# Computer Weekly

Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS

Thursday, May 12, 1983

## The City is ready to invest

CONCLUSIVE proof that the City is now more than ready to invest in UK computing firms has come with Micro Focus' offering of 23% of its shares on the Unlisted Securities Market.

Micro Focus is known in the industry for its Cobol compilers. It also has related products for checking program code and generating terminal screen formats.

But try explaining what that means to someone who knows little, if nothing, about computing, and yet is being asked to put up a lot of money to support such a company.

Sir Timothy Hartford, a director of merchant bank Singer and Friedlanders, which is sponsoring the share placing, was putting it mildly when he introduced Micro Focus to City specialists last week as "a company dealing in a market not very well known to most people".

The brochure introducing the company to potential investors talks about compilers as "systems software programs"; one City specialist at the company presentation whispered to a colleague, "What's software?"

Yet if City people are baffled by what Micro Focus sells, they are raring to go with the share placing. It is being underwritten by 35 hardened City firms. And Sir Timothy expected no problems in selling the shares.

Several high-technology firms have found ready acceptance in the City over the last three years. But Micro Focus is different from the computer manufacturer or systems house which can show potential investors a system aimed at a specific market such as accountancy. Such a system is easy to understand. The idea of a compiler is difficult to grasp.

So clearly any company with a good product and sound market prospects can now consider the Stock Exchange as a source of funding. However esoteric the product the City is ready to respond.

But the approach must be made seriously, as Peter Minton's letter (this page) makes clear. It is no use for technical people with a bright idea to go to the City in a slap-happy way.

Micro Focus' presentation was well received, however, but its products might have seemed. Chairman Brian Reynolds in particular came over very well and got away with refusing to give a profit forecast or pay dividends in the foreseeable future.

The backing is available. But the approach must be right.

Good riddance, Bills

TECHNOLOGY and elections would seem to have little to do with one another, unless one counts the intriguing swingometer (latterly and unhappily superseded by computer predictions) of the late commentator Bob McKenzie.

But this time our industry is particularly affected. Just as the government seemed on the verge of pushing through its Bill to sell off British Telecom, the Data Protection Bill, and the Cable White Paper - all is thrown back into the hopper while the nation decides whether it wants another stint of Tory rule.

All and all, it is perhaps no bad thing that a fresh start will have to be made. The Data Protection Bill has drawn widespread criticism, and even the government may welcome the opportunity to iron out some of the wrinkles. No sooner was the election date set than a number of industry groups began formulating proposed legislation.

The sale of 51% of British Telecom to the private sector also has its critics. While it is unlikely that the form of the Telecommunications Bill would change radically if the Conservatives are returned to power, it is proper that it should be an election issue. The Labour Party has made plain it will make it one, and in any case the Conservatives had not scheduled their programme to come into effect until after another election.

Whatever the result, it is to be hoped that the next government will put the issues that effect our industry near the top of their list. And that means less talk of "principles" and more positive action.

## 1984 and all that ...

This week's example of the strange things people say about computers was sent in by Fiona Denholm, of Comrie, Perthshire, who writes:

The village, now replacing Disney's old coaxial network, feed information from nearly 4,000 sensors (sic) in the vast Disneyland complex (twice the size of Manhattan) to a Sperry computer brain at the new Epcot complex - the billion dollar Disney dream of an experimental prototype of tomorrow which has just opened.

The Guardian

## LETTERS

## No data is harmless

THE problem with Rodney Hylton-Potts' thoughts (Computer Weekly, April 28) about possible exempt "harmless" data is that there is no such thing, any more than there exist "harmless" people exempt from the laws of burglary or fraud.

The clue to this lies in his own final phrase: "Mass of enterprises ... with no intention of divulging that data to outside parties."

The problem lies in the fact that his proposal would mean that, intention or not, no-one would ever know whether they had so divulged.

There are two possible solutions to his dilemma. Firstly, if an adequate tight definition can be made of personal data systems where everyone who is contained within it as a data subject must know they are so contained. Then, if all such systems are made liable to the

principles of the law and the Registrar is given power, in general and in clause 28 where appropriate, to enforce the subject access and non-disclosure principles, then registration may not be necessary. But dangers would remain.

The alternative and better solution would be to define such systems and give the Registrar power to delay this registration until such time as he has completed the registration of the 60 to 100,000 other systems which are more critical and necessary to be controlled.

Unfortunately this is a suggestion which the Home Office resisted in the Lords. But perhaps they can be encouraged to see the light on this, as on a number of other matters in the Bill which require amendment.

G. A. FISHER

London W13.

## Price of a Ferranti system

YOUR article (Computer Weekly, April 21) refers, somewhat ambiguously, to Rapport and Ferranti Argus 700 machines.

May we allow any fears our potential customers may have, by explaining that the £25,000 mentioned is the price of a com-

plete system consisting of both hardware and software.

WALTER SMITH

Publicity Manager  
Ferranti Computer Systems  
Wythenshawe Division  
Manchester.

## New firms - do it right!

OVER the past year Computer Weekly has carried many stories of investors rushing into computer associated investments - and not a few of computer companies going down the "tube".

As anyone involved in trying to raise funds for small companies knows only too well, for every company that gets an offer of capital there will be nine that are turned down - and twenty which do not even get to base. Most are turned down because their ideas are badly thought out, poorly presented and financially suspect.

There is a classic pattern to most of the companies or individuals who call on our services. The people concerned have had an idea/product in the computer field and have used such savings as they had to start out on their own. The bank manager has loaned them money against the security of their home - has allowed them to get in over their heads and has just frozen their overdraft/loan account and they are unable to pay the bills. Help!

Then comes Catch 22 - no financial institution will take on another's "bad debts" so it is necessary to work through your existing bank; and they do not understand what you are doing or how long it takes to clinch those

order, which are tentatively just out of reach.

It takes some time to draw up a decent proposal and up to six months to get a decision on it from an institution, venture house, etc. In the meantime the bank is likely to call your guarantee; and you are in the mire. If people at least started from the right end it would help - proper advice from day one; help with the proposal; an independent assessment of the viability of the idea; etc.

Very few people "out there" will understand the technical side of what you are trying to do and it will always need at least five times the amount of money you calculate it will! If you underestimate how much you need you will end up in trouble. The institutions are generally not geared to advising on this aspect but the venture houses - which demand a very high standard of presentation - will show you where your proposal goes wrong and make it clear what the position will be when you need a second bite at the cherry.

So, if considering going out into the wide world with that idea/product remember - do it right.

PETER MINTON

Proprietor  
Financial Counsellors  
London W1.

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CW

## Liveware File

by Don









## WORKPLACE

# New guilds after young members

A SURE measure of the maturity of a profession is the number of organisations its practitioners can belong to.

By this measure, the computer industry can be said to have come of age this spring, with no fewer than three such bodies welcoming programmers, operators and systems analysts.

One is the Institute of Mechanical Engineers, which recognises a new grade of member: the software engineer.

But more important are two new guilds being set up for the younger members of our industry.

One to be formally launched in July is actually a spin-off from the powerful Association of Business Executives. It will be called ABAC (Association for Business and Administrative Computing). Membership fees have yet to be announced, but a star-studded panel has. Chairman is Colin Milner, deputy director of North East London Polytechnic, and council members include ex-Labour minister turned Tory, Reg Prentice and MP Christopher Price.

The other organisation, the Guild of Computer Practitioners, was launched last month. At its chair is one of the oldest hands of the training game, George Parkinson. He heads a group of computer training companies including the

London Computecentre. In 1960 he became managing director of the first independent College of Computer Education in the UK.

The two new organisations aim to fill a gap left by other professional bodies like the British Computer Society (BCS) and The Institute of Data Processing Managers (IDPM). Both BCS and IDPM serve the interests of more experienced computer people and their members have an average 12 years or so experience.

The Guild was received with scepticism by the IDPM. "We wonder whether there is a place for an additional body," says the institute's George Penny, who is also chief operator in training for the National Computing Council.

Penny also dismisses the Guild's claim to be co-operating with the Council in training. "It is an exaggeration to say that the guild and NCC are collaborating," he says. "We're mildly interested."

But both the Manpower Services Commission and Cosit, the Computer Services Industry Training Council, welcome the new organisations.

"We profoundly disagree with the view that adult training places are not needed," says Hugh Sharp, head of computer operations at the MSC.

And Gordon Ewan of Cosit says:

"There is a need there for something under the BSC and IDPM." The BSC has only 27,000 members, and the IDPM just 7,000, he points out. But there are 300,000 people working in the industry. "There aren't many bodies interested in young people," Ewan laments.

Both the new bodies aim to help young people reach standards that are accepted by computer companies. The Guild will use City & Guilds certificate as the basis for its membership examination.

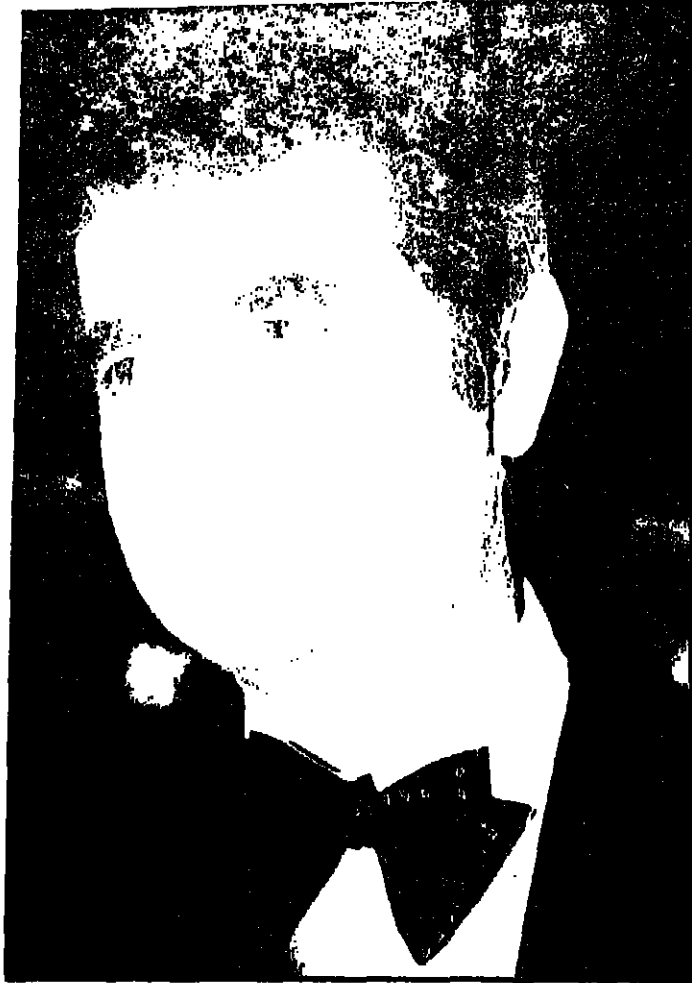
But ABAC is setting up its own examination system, although it will use existing qualifications as exemptions. Both organisations recognise that the industry is more interested in experience than paper qualifications.

ABAC says that its progressive grades of membership will be based on years of relevant work experience.

"This will be a vocational qualification, not an academic one," says ABAC secretary Ken Cropper.

The Guild is offering membership to individuals for £15 plus an annual subscription ranging from £10 for a student to £35 for a fellow.

But the success of both organisations will depend on how many companies can be persuaded to



EWAN... Welcomes new organisation for programmers and analysts.

join, or at any rate take an interest. It is not much use offering students qualifications if companies do not give them jobs.

The Guild is offering corporate membership for £1,000. Private

training companies would pay an extra £150 for each student accepted as a Guild member and found a job as a result.

ABAC says there will be a provision for corporate membership.

## Eight get hands on Ada

EIGHT programmers are a week getting their hands on Ada, a one week course given by the CAP Group in London. The course is aimed at programmers familiar with at least one high level language," says course lecturer Kim Griffiths.

The course lasts a week, with half the time given to lectures and slides, and half to practical writing programs on a Digital Equipment Corp. Vax computer using CAP's US-developed Telesoft Ada compiler.

The first course is limited to eight programmers, but CAP products manager Richard Lever says that more will be held as demand dictates. The idea of the course, says Lever, is to spread the word in the UK that Ada is a very powerful language, capable of defence and commercial applications.

"Telesoft has sold 250 of its compilers in the US, for development of systems," says Lever. "Over here we've got a great deal of interest, but I think people are waiting for the Ministry of Defence to show interest."

"Perhaps the MoD is waiting for full Ada compilers to be produced."

The Telesoft Ada compiler is not yet up to the US standard for the language announced in February this year by ANSI, the American National Standards Institute. But Lever says that the next version to be released later this month will have the full ANSI standard syntax, although still lacking some of the more advanced language features such as generic and task types especially useful for defence applications.

But the version after next, expected in the autumn, will be a full one, and will be validated by the US Department of Defence which set up ANSI.

Meanwhile programmers on CAP's Ada course can use many of the language's features, including variable types and arrays.



Castles make good computer rooms - the thick walls keep an equable climate inside.

## Castle where an NCR is king

NEIL MacLeod left his computing job in Glasgow last September to become data processing manager at one of the few installations in the Paul McCartney country of western Scotland.

The installation can also claim to be one of the few to be housed in a converted castle.

"Castles make excellent computer rooms," says Neil MacLeod proudly.

"The stone walls are some two and a half feet thick and that helps keep the temperature and atmosphere stable."

The castle, home of Argyll and Bute District Council, is in a small town of 3,000 people, Lochgilphead.

MacLeod's job is to run local government packages on the Council's NCR computer, and install a network of terminals at the seven area offices linked to Lochgilphead by private telephone line.

Argyll and Bute occupies more square miles than any other district in Britain, but has one of the smallest populations of just 65,000.

As MacLeod says: "Our problem is not one of transaction volumes, but of communications."

Three of the seven council offices are on the islands, and at present it can take up to a week for returns of rent or rates to filter back to head office by ferry and road.

But this will change when the network is complete.

The remoteness of the site also affects NCR's support of the computer. By road it is two hours from Glasgow, so engineers hop on a helicopter for a 20 minute journey.

In theory the software packages for payroll, financial ledger and payments to creditors run themselves.

But in practice some support is needed, and MacLeod has an operator, a data preparation supervisor, and data entry staff working the six terminals in the computer room.

All the staff, except MacLeod, are locals without computing experience.

"This is the only installation for

skills, so there's nowhere for the staff to go - but anyway everyone's delighted to stay in this area," he says.

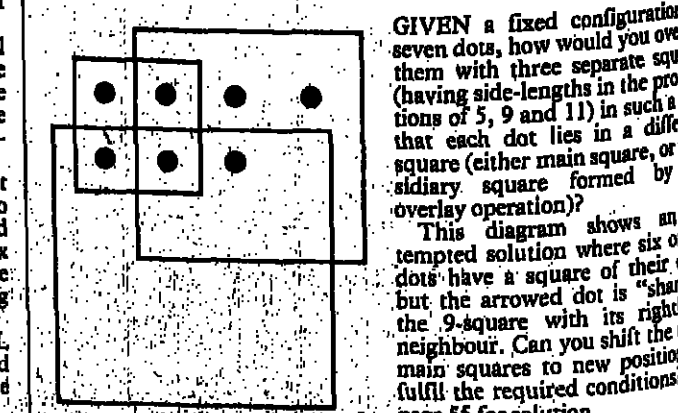
"I don't miss the city; here we've got hill walking, golf, sailing, fishing, whatever you want."

Unless you like routing in the Big Apple.



"... so, other than felling trees to make paper to feed computers, you've had no previous experience."

## PUZZLER



GIVEN a fixed configuration of seven dots, how would you overlay them with three separate squares (having side-lengths in the proportions of 3, 9 and 11) in such a way that each dot lies in a different square (either main square, or subsidiary square formed by the overlay operation)?

This diagram shows an attempted solution where six of the dots have a square of their own, but the arrowed dot is "sharing" the 9-square with its right-hand neighbour. Can you shift the three main squares to new positions to fulfil the required conditions? See page 55 for solution.

## Bugs infect sick pay software

FEW people understand the workings of the new sick pay scheme inflicted upon us by the government this April. And unfortunately, the few that do understand it does not seem to include some of the software houses that wrote programs to implement it.

Many of the systems, particularly the smaller ones, to run the new Statutory Sick Pay (SSP) scheme have the same two serious bugs, according to the Information Management Services. Many companies are likely to be affected.

Under SSP, employers are required to pay sickness benefit directly to their workers, and then regain their from the DHSS by reducing their national insurance contributions. Under the old scheme, employees went to the DHSS themselves to claim sickness benefits for illnesses lasting more than a week.

The first problem with SSP software concerns weekly-paid employees. Their sickness benefit is

determined by averaging out their earnings over the eight weeks before the one they fall ill.

But if someone falls ill on the day that week's payroll calculations are done, it may be too late to include the sick pay calculation that week. Therefore it is deferred to the next week.

But some SSP software systems only keep eight weeks earnings data, so by the next week details of the first of the eight weeks have been destroyed. Result: the wrong eight weeks are used to determine the average earnings.

Cure for bug: keep earnings data for 12 weeks before discarding it. If you think that bug is esoteric, wait for the next one. It arises when companies operate their own sick pay scheme as well, and when different days are used to calculate the amounts due for each of the

## Control Data gives seal of approval

The company can claim back from the DHSS the amount it would have to pay under the SSP scheme for each day. The problem arises with some systems that calculate the amount to be paid, and the amount to be claimed back on a week by week basis. Then when the days used to calculate the amounts for the two schemes do not match, errors occur.

Cure for bug: calculate the amounts on a day by day basis. Michael Copleston of IMSI in Exeter is handling enquiries about SSP software. He believes that the government has pulled a fast one on both workers and companies, without causing much protest.

Employees are often worse off under the new scheme, he tells me, because the new sick pay is taxable.

Workplace is compiled by Philip Hunter

# Microdata.

Since 1969, CMC has enjoyed continual success in the British computer sphere, first as a pioneer of key-to-disc and data entry systems and subsequently as a designer, manufacturer and supplier of advanced local area networks, easy-to-use relational database mini and supermini computers, and innovative software tools.

For the past five of those fourteen years CMC has been a subsidiary of the worldwide Microdata Corporation. The association has enabled CMC to radically widen its horizons and manufacture in Britain for world, as well as British, markets and to collaborate on international high-technology research and development projects.

Now the time is right for CMC to integrate more fully with its multi-national partners through whom a large and increasing proportion of output is exported. From now CMC's manufacturing and research interests will

become Microdata UK Limited and CMC's sales and marketing organization will become Microdata Information Systems Limited.

Little else changes: we are still 1,000 Britons, we are still expanding at 35% per annum, we are still net exporters earning foreign currency, we

are still creating jobs (200 last year) and we still have a wealth of expertise of special relevance to the

computer needs of the public service sector,

Times top 100 companies, and, of course, export. So from now please call us Microdata.

And, please, call us.

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# COMPEC SCOTLAND PREVIEW

## Glasgow belongs to Compec — for a second year

Sarah Underwood previews some of the show's exhibits

DRESS rehearsals for the UK's largest computer show, Compec, are underway as exhibitors go north to Glasgow, the next venue on the Compec calendar.

Over 50 companies will display their wares at this year's Compec Scotland which opens on May 17 in Kelvin Hall, Glasgow. The three-day show, now in its second year, attracted 46 exhibitors in 1982, and 2,700 visitors.

Compec Scotland is sponsored by *Computer Weekly* and its sister journals.

While one exhibitor described his attendance at Compec Scotland as a "fact finding mission", the majority already look on it as a way of expanding into a region where the market is still in its infancy.

Among the big names at the show will be Hewlett-Packard, GEC Computers, Digital Equipment, British Olivetti and Racal-Milgo. The UK's microcomputer suppliers will also be out in force led by ACT Sirius, while Cifer Systems and Oxford-based Hytec Microsystems will be among those showing new products.

The Cifer Club low-cost micro, scheduled for launch in the first week of May, will make its public debut at Compec Scotland along with the first systems manufactured by Hytec, which until recently brought in US-made machines to which it added com-

munications capabilities, disc drives and other peripherals.

Cifer's desk-top micro, incorporating a 5 Mbyte Winchester disc drive and an 800 Kbyte floppy drive is built around two 280 processors and has a detached 100-key keyboard. At £3,395 for a system with 64 Kbytes of random access memory, the Club should attract a lot of interest, particularly as it is coupled with the promise of larger Winchester drives with a capacity of up to 21 Mbytes and expansions of user memory of up to 256 Kbytes.

The company will also offer a 68000-based 16-bit add-on board for the system with 256 Kbytes of RAM and the Unix and Idris operating systems. That will cost an extra £995, but will give users a single user desk-top Unix machine for £4,000 plus.

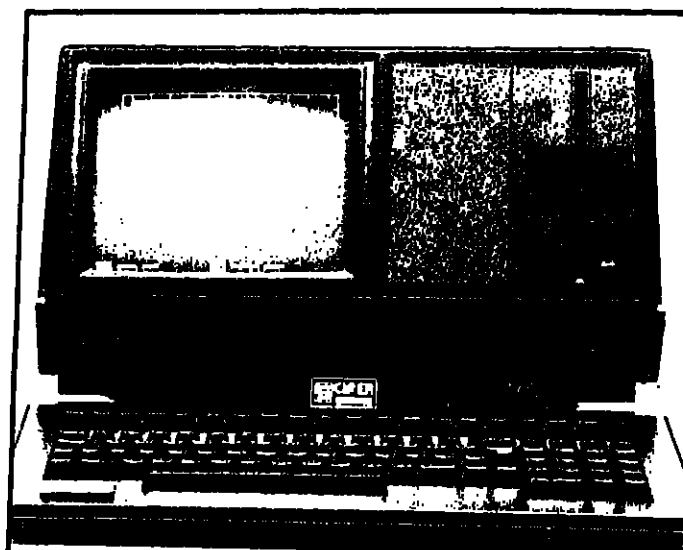
The new systems, like Cifer's existing intelligent terminals, will be marketed through OEMs and dealers. A spokesman for the company said: "Peritronic is our Scottish distributor — our products need representation in Scotland. Compec is a good outlet for OEM volume buyers and the Club should appeal to general purpose users, for example, those doing commercial applications, while the Unix option will interest the education and research markets as well as software houses."

Hytec is also planning to use



Compec Scotland for first demonstrations of its Prelude range which goes from interactive terminals to a new 8-bit micro with 50 Mbytes of hard disc storage. Manufactured in the UK, the system is designed for growth and will be displayed alongside Hytec's latest network system.

Besides networking facilities the micro will have the communica-



The Cifer Club micro, which will make its public debut at Compec, Scotland.

tions systems designed by the company for the BCS Microsystems which it imports from the US. These allow the micro to be used as an online terminal to ICL mainframes, as well as Honeywell and Burroughs machines.

ACT Sirius will rely on tried and tested products to pull the crowds, although it is adding a regional flavour to its stand. Nine members of the Scottish Sirius Dealers Association will join ACT on Stands 227 and 327 over the three days of the show, where it will be exhibiting the faithful Sirius business micro along with the Winchester-based version of the system.

ACT's latest Writer range of printers and its desk-top photocopy will feature on the stands, while the Pulsar business software will be demonstrated on the Winchester Sirius which is now reaching the UK in volume shipments at a breakthrough price of £3,995 for a 10.6 Mbyte system.

A company spokesman commented: "This is our first visit to Compec Scotland and we'll be targeting the business and industrial markets. Edinburgh University already has 60 Sirius machines and local industry seems to take a lead from what the local universities do — that has a good knock-on effect for us."

Other micro suppliers to watch out for at the show will be Digital Equipment with its Professional, Decmate II and Rainbow 100 personal computers, Multicomputer and Glasgow-based Micro Change.

Visitors to the exhibition wanting larger systems, and prepared to pay a lot more for their computing power, should take a look at British Olivetti's business systems on Stand 121 and GEC

There are still plenty of Compecs in store. Compec North will be held at Bellevue Manchester from June 21 to 23, while the Compec to beat all Compecs, Compec UK, will be at its traditional venue, the Olympia Exhibition Hall in London from November 15 to 18.

Computers' 4000 Series minicomputer.

GEC, making its first appearance at Compec Scotland, will display the desk-top 4150 system which costs upwards of £10,000.

The machine will be used to demonstrate private viewdata systems for both business and commercial applications including stock control and ledgers. The database management system Raptor suitable for the whole 4000 range, will also get its first public airing.

A GEC spokesman said: "We have a lot of customers in Scotland, particularly among the universities who use GEC kit for communication networking. The 4000 Series is ideal as a communications node linked to a host computer or as a standalone system."

Communications companies will be well represented at the show, with Racal-Milgo and General Datacom among the better known names.

Racal-Milgo will be wooing Scottish agents and potential customers with the Planet local area network and a range of modems featuring Omnimode 48, a software based intelligent modem. Demonstrations of auto-diallers will also be running as well as the minicomputer-based CMS network management system.

General Datacom, a regular at the Compec shows, will introduce Scottish visitors to its Megamux multiplexer which can be used with British Telecom's Kilo-stream and Megastream high stream digital services.

Besides Megamux the company will exhibit a full range of multiplexers, modems, network control systems and intelligent data switching products.

"Megamux is setting the pace in the UK and we hope to demonstrate its features," said the exhibitor. "We serve the Scottish market out of our Edinburgh office and are hoping to attract potential users we haven't come into contact with before. When there was only Compec in Olympia we welcomed the provincial distribution of the exhibition as it gives us the oppor-

tunity to promote our products on a regional basis and to get to an unpenetrated audience."

Peripherals manufacturing Control Data is also making a return visit to Compec Scotland, with its disc drives and tape devices.

Removeable, fixed and combination disc drives will be on display, including 8-inch drives with removeable 80 Mbyte discs and small fixed disc products with a 160 Mbyte capacity. CDC's Finch Winchester system with 8, 24, 32 or 40 Mbyte capacity will be exhibited alongside the Lark, which can handle fixed or removeable media or a combination of the two. In the 5 1/4-inch range CDC has the Wren, a 19 or 32 Mbyte Winchester device.

Among the tape products the company is taking to Scotland are the Keystone W-inch tape transport with a streaming speed of 100 inches per second and the Sentinel W-inch tape cartridge which can accommodate up to 48 Mbytes on a standard CDC 300XL cartridge.

Other features of CDC's stand are its flexible disc products and the 9334 dot-matrix printer, a 150 characters per second impact printer suitable for terminal or minicomputer applications.

Moving away from commercial applications, Hewlett-Packard has chosen to demonstrate products from its measurement group instead of its more widely recognized computation branch. Two instruments for designing products, the HP64100A logic development system and the HP1630 logic analyser, will be on Stand 508.

The logic development system is an engineering tool to aid the design and development of microprocessor products, and is part of the company's 64000 set of tools for hardware and software development, emulation and analysis.

The low-cost logic analyser, priced at around £7,900, is a high performance bench-top system which guides the designer through the three vital steps of timing, state and software performance during development.

But for visitors who come to the show with no notion of parting with any money, there are still attractions at Compec Scotland and a chat with the various development corporation representatives may be lucrative.

Strathclyde Regional Council can be found on stands 221 and 321, Irvine Development Corporation on 711 and 712 and Livingston Development Corporation on Stand 203. Livingston will be promoting the benefits of relocating in Scotland and explaining the grants available to companies considering setting up in business there.

A spokesman for the development corporation said: "We hope to attract a number of companies. Grants depend on the number of jobs a company brings with it — we're aiming for 2,000 new jobs a year. So far we have 165 manufacturing companies, about 30 of which are in electronics manufacture."

The Department of Industry is also eager to hand out financial backing under its Microprocessor Applications Project (MAP). At Compec Scotland it will outline government support schemes for industry, which in Scotland has already benefited greatly from MAP funds, introducing microelectronics into products, processes and control systems.

Examples of the MAP scheme at work in Scotland include the computerisation of a plant producing mailings for whisky which received £22,000 towards the development of the £88,000 systems, and the development of oil rigs designed by Babcock Instruments which won a £13,000 MAP grant.

As one of the project organisers put it: "MAP grants can be as high as 33% of development costs. The scheme started in 1978 with £55m to which £30m was added at the end of last year — and there's still plenty of money to spend."

## COMPEC SCOTLAND

### A home-grown micro success story in land of industry giants

Future Technology Systems, established two years ago, has now expanded into a second Scottish plant... Robert Parry reports

LOOK around Scotland and you will find computer companies all over the place — and they seem to be mainly offshoots from big American companies. IBM is there in Greenock putting together its Personal Computer, DEC is there. So is Prime. And they will soon be joined by Wang, spreading out from its European base in Ireland.

Then there are the semiconductor outposts of Japanese and American companies, neatly placed to supply the chips the system builders need. Again it is the big names you will find. Motorola, National Semiconductor, General Instruments, Nippon Electric — just for starters.

But look a little closer, beyond the establishment names, and you will find a home-grown success story — Future Technology Systems, nestling 20 miles south-west of Glasgow in Belth, an Ayrshire town deserted by the steel industry and pulling in new high tech industry to its industrial estate.

Established two years ago with £1 million backing from Norwich Union Insurance, Scottish North-west Investment Trust and the Scottish Development Agency, FTS early this year expanded into a second manufacturing plant in both — part financed by an extra £700,000 put in by the three original external investors — and increased the size of its marketing office in London.

The new 10,000 square feet of the new plant means FTS can separate the R&D and the manufacturing aspects of its operation and, according to its managing director Peter McHugh, marks a major transition for the 100-strong company.

"We have moved through the first phases now — design development, establishing the company, setting up marketing and production — into volume production. It is a high volume product range based on the personal computer concept, with continuing development, particularly in peripherals and with faster processors."

But this line, aimed more at the business user, is not the only trick FTS has up its sleeve. It is also moving strongly towards the more sophisticated office automation machines with networking, electronic mail and communications facilities. These types of capabilities will appear first on FTS' original product range — its own-label Series 88 — rather than the lower end machines tailored to particular OEM customers.

"Series 88 still lives and develops," says McHugh. "It gets the more sophisticated developments while the OEM machines get the lower level things to do the less sophisticated end users."

Less sophisticated they may be, but it is these end users, buying machines designed and built by FTS but with other companies' badges on them, that will create the volume demand that prompts the expansion of the FTS manufacturing lines.

All the machines, whatever badge they wear, share a common architecture and its OEM business derivative machines, McHugh feels, the FTS has the system product that can cash in on the market for a truly multi-functional device. It provides information processing both word and data — with general office automation functions and communications capabilities.

most comprehensive family around at the time or in development, says McHugh.

FTS' initial product, the Series 88, set out to meet the need for a true multi-function device with a common user interface. Philosophically the stance was to give every user of the system a separate 16-bit processor, though other factors have since come into play driving FTS along the shared processor route too.

But it is not just a hardware approach. "We are looking for real use of microcomputer products," says McHugh, "not people just playing with machines, but operating them for real useful applications. People need better tools — and need to be educated in using them."

Because of this view that it is not hardware that makes a good machine, there is a high concentration on software aspects, at the application and system level. Complex multi-user software is eliminated by providing both a file sharing program in the system management unit — which co-ordinates the sharing of peripheral modules among several workstations — and a single-user multi-tasking operating system in each workstation. This operating system uses MPM as a building block.

The growing interest of the company in the communications applications for such microcomputers requires a high concentration on combining appropriate hardware and software. It makes the use of a 16-bit processor (the 8086 in this case) much more than just the marketing device it seems with so many "16-bit" business micros.

are particularly noticeable because of the cramped premises most travel agents seem to inhabit.

"It's just a question of publicity to educate potential users," he comments.

Although the ABTA deal moved more slowly than expected, because the Canadian company co-ordinating the project, Caltrav, failed and the project went into hibernation for a while, McHugh sees such deals as one way forward for the company.

"With the 88 we only looked for a volume market, and found two major flavours." One was large companies and government — helped recently by the cachet of getting on to the Central Computer and Telecommunications Agency (CCTA) list of micro-sanctioned for purchase by central government departments. The other flavour was large OEMs or distributors.

"They buy in products from companies such as ours," says McHugh, "but do not want to be seen to be selling the same product as everyone else. It's a matter of pride, of image, and of worries about pricing. They need to sell

One way he saw of getting at people buying one-off would be through trade associations.

Members of these associations are buying single machines, doing all the spare work over and over. A trade association should do all this, developing software and any extra hardware needed and buying machines in bulk." Handling the link with ABTA, now spreading to the travel agents abroad via UETA, the Universal Federation of Travel Associations — a sort of association of associations — and spreading new wings into the legal profession through a similar arrangement.

"We are in direct contact with a number of ABTA equivalents around the world," says McHugh, "and the great thing is that 90% of the system will be the same for all the travel agents, mainly because of the standard ticket issuing practices imposed by the airlines."

The first deal FTS has set up through its OEM division for the lower end machines is personal computer for small businesses, is confusingly enough, with a company called ORB, Office and Electronic Machines. The computer appeared a couple of months

ago as the OEM Orion, and is set to come out in other guises from other marketers. The machine can be clothed in the companies' house colours in two or three months, claims FTS, can have additional expansion options and customised casework within six months, or can be designed completely

One of FTS' early successes on the business front was a 1,000-system order from the Association of British Travel Agents (ABTA). "It's the start of a new recognition," reckons McHugh, adding that the travel agency environment is one where the advantages of space saving with everything concentrated into one device

ities to other computers and to the rest of the world via telex and viewdata. And it does this with a modular system that has a common hardware and software interface that makes the Series 88 a relatively uncomplicated beast as far as the user is concerned.

"Multi-functionality is the key. Providing telex, word processing, a small business system, a multi-function terminal, viewdata and so on in one device means a lot to the business user. He would save on floor space, on capital cost, on operator costs. But people have not recognised the real benefit of such multi-function devices yet — though they are starting to come round to the idea."

There is no future for those companies that just churn out small personal computers. Anyway, personal computer boxes like that are boring.

There is no future for those companies that just churn out small personal computers," reckons McHugh. "Anyway, personal computer boxes like that are boring."

He reckons that the deal with Office and Electronic Machines was timely. The time span between signing and delivering the pre-production prototype

which involved a number of new technologies for FTS — was only nine months, showing just what an adaptable small company could do.

"Big companies just cannot react that quickly," says McHugh — a failing he ascribes to ICL among others. "If there's anything ICL needs it's a fully integrated product range and the ability to call on a quick reaction from a production design team. It was very sad, not just for us but for the industry as a whole, that ICL did not choose us for its micro venture."

McHugh sees the lack of entrepreneurial get-up-and-go he finds in British industry as a defect.



McHUGH... "People need better tools — and need to be educated in using them."

Perhaps there is too much concern with risk, he says. There is certainly a problem with the small size of the home market. "If a British manufacturer is to do well he must look further afield."

FTS is presently exploring the US, dipping a toe in the water there with a booth at this month's National Computer Conference, and is paying more and more attention to Europe. This is partly because it is so much closer to home, partly because of the experience of selling into Europe within FTS.

The way into European markets is through joint ventures or through sharing technology, he says. It is not just a question of putting in distributors. The sort of shared technology joint venture he has in mind would involve combining the FTS workstations with a complementary product such as a PABX system.

Despite a few hiccups along the way, with turnover and staffing below anticipated levels at the end of the company's first full trading year last July, the future looks bright for FTS. It raised more money from its primary investors to fund growth in the coming months, and is looking towards a placing on the Unlisted Securities Market next year.

Has being in Scotland helped or hindered it on its way? Staff turnover is very small — people like working in the region and tend to stay there. Communications by air and road are good. And there is still plenty of space for growth.

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PENDSE... "Early systems little more than report writers."

## Success story that started mythology Probably the industry's fastest growing area

■ From page 19

a single Diablo daisywheel printer that he accepted the reports, saying: "I'm so glad you've abandoned those computers and gone back to typing my reports!"

"The early financial planning systems," says Pendse, "were little more than report writers, with only basic modelling capabilities."

Larry Kurtz, a director of Doric Computer Systems, agrees with this early trend. "The early problems," he says, "were overcome by the development of special financial planning languages and usually offered a supported service to help the users of the system. At this stage the typical financial models were long range plans. The models were developed so that senior management could see the effect that the model produced to differing assumptions of future volumes and associated financial values."

Very soon, the first spreadsheet

systems began to appear. "These were logically similar," says Pendse, "but not so named, as the contemporary microcomputer 'Calc' package. Fundamentally, these systems generated a language program that the user then 'ran' — so, in a sense, they were also early variants of today's program generator. Comshare's system in 1968 was called Dataform, but the company soon realised that this approach is both inflexible and insufficiently powerful."

Instead, Comshare, and all its rivals, began to develop a modular logic file approach. This type of system splits the model into several component parts, where the data matrix, for example, is held separately from the relationship rules.

To summarise then, the non-modular approach can be easy to use, easy to learn, and dynamic; but restrictive. The modular approach, on the other hand, can separate the data and logic, and is thus harder to use, but can be much more powerful.

From here, and throughout the 1970s, developed what Pendse calls "the second generation of financial modelers." To begin with these were primarily developed by the end user, with varying degrees of aid from the bureau company, and include PCS and PlanMaster. These two were originally developed from within Unilever and Wiggins Teape respectively.

In 1973, EPS consultants was formed to market FCS as an international time-sharing service. Says Peter Morrell of EPS: "Financial planning evolved originally from a time-sharing bureau offering to an in-house mainframe offering as a result of bureau expenditure becoming too heavy. Then the micro entered the market as an entry level for users requiring some form of automation."

"This micro-planning market is, today, probably the fastest growing and most rapidly developing area of the computer industry."

"Hardware has grown in the last three years from the low-powered eight-bit CP/M-based systems to the current range of MS/DOS and multi-user Unix based systems such as Sirius, IBM, Fortran and Zilog (and, of course, we are already seeing the futuristic 32-bit micros such as the Sage IV based on the Motorola 68000 chip)."

"Software has also developed rapidly from the VisiCalc simple spreadsheet type of system to Micro-FCS (the micro version of FCS-BPS) with the ability to perform a wide range of complex functions."

The advent of the micro into

financial modelling is viewed very differently from different standpoints.

"Financial planning programs on microcomputers," says Graham Summers, managing director of Planning Consultancy, "has been one of the major reasons for the growth of microcomputers over the last few years. Programs like VisiCalc from VisiCorp, and SuperCalc from Sorcim, have provided the user with a quick and easy way to analyse numbers. This type of program has been labelled 'spreadsheet' because it tends to replace the columnar type of analysis paper used for financial analysis."

This view is echoed by Dick Moore, technical director of Peachtree Software International (suppliers of PeachCalc), who states: "We find that businesses now view an electronic spreadsheet as an essential piece of equipment — just as pocket calculators gained acceptance about 10 years ago. The software is becoming more comprehensive and once the user has the spreadsheet on his desk he is using it for an incredible range of applications."

Summers sees the spreadsheet approach as firmly in the domain of the micro, with the modular logic file belonging to the mainframe. But, he goes on: "Both sectors of the market seem to be picking up ideas from each other and incorporating them in products..."

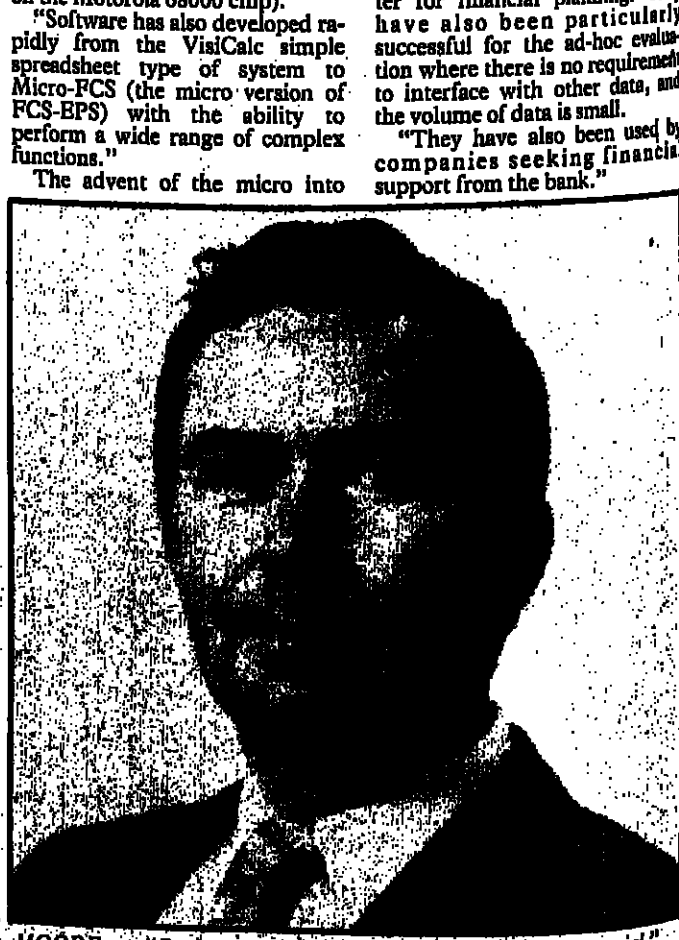
The better mainframe programs now include some of the facilities of the micro versions — for instance, using the cursor to scroll around the screen, and using financial planning output data as associated graphics input data.

"On the other hand, micro systems are learning from their more powerful cousins to become more powerful, more flexible and to contain more sophisticated 'help' information on disc."

But, according to Doric Computer Systems: "The advent of the micro with its spreadsheet software has been something of an anomaly and may be more an expression of frustration by middle management who have not been able to get access to good software on their mainframe computer."

"Nevertheless, VisiCalc and the other follow-on products have sold well and have given users an insight into the power of the computer for financial planning. They have also been particularly successful for the ad-hoc evaluation where there is no requirement to interface with other data, and the volume of data is small."

"They have also been used by companies seeking financial support from the bank."



MOORE... "Businessmen view an electronic spreadsheet as essential."

## The mainframe path is the route for micros

Software Month looks at two development paths  
emerging in financial planning software

IT is becoming increasingly apparent that it is not the mainframe that is under threat from the micro, but the microcomputer.

The likely future is that more and more powerful microcomputers will link together under local area networks, and be backed by the power and storage capacity of the mainframe.

For this to happen presupposes, in the words of Doric Computer Systems, greater "connectivity" between micros and mainframes. The first signs are already clear within financial planning software, where two distinct development paths are becoming noticeable.

In the first, software producers are providing a growth path from micro to mainframe; in the second, microcomputer software is becoming more powerful and more flexible.

Just as there are but a few, out of hundreds, that dominate the micro hardware market (Apple, Commodore, IBM, Sirius, DEC), there is but a handful of software producers in a similar position (Microsoft, Micro Focus, Digital Research, Peachtree).

Perhaps the biggest single name in micro software is MicroPro, the Californian company behind WordStar, DataStar, InfoStar, SpellStar and CalcStar.

MicroPro has recently opened offices in London, underlining the European commitment it started by moving its software development team to Ireland. David Butcher heads the UK operations.

"CalcStar," says Butcher, "is only one of an integrated suite of microcomputer packages. It is fully compatible with WordStar and InfoStar, and is already undergoing extensive further development. Development is, however, a lengthy process. Like all spreadsheet systems it is fundamentally a single program and cannot be developed by multiple teams working in parallel."

He recognises two contrasting attitudes towards spreadsheet simulation in micros. "To some," he says, "it is the be-all and end-all of microcomputing. To others it simply cannot do enough."

"While on the one hand some mainframe users are buying and installing Z80 cards so that the mainframe can use MicroPro products such as WordStar and CalcStar, so are many current users of micro spreadsheets beginning to demand the power and flexibility of module based, logic file systems" (such as MicroModeller).

Since no software company seems able to locate a market requirement without attempting to fill it, it is an even bet that MicroPro will shortly announce a new product in the ever-growing Star line. The only question is whether the company will develop it completely in-house, or take and adapt an existing product.

One company that has already taken this latter approach is Comshare. Like most large system companies, Comshare entered the market very late. When it did, it did not want to start from scratch; so it took the alternative route and

bought an American company with an existing product (already known in this country as Target Planner). This product was then developed by Comshare into two new and completely compatible products: PlannerCalc and Master-Planner.

PlannerCalc was conceived as an entry-level product — not so much in its capabilities as in its price. With a brilliant stroke of marketing, PlannerCalc literally exploded into an already crowded market.

Comshare virtually gave away the product at less than £30. And yet its power and versatility is similar to competition at five times the price.

A year later the product has been re-priced at a more realistic £89. But the objective has been achieved. Market awareness of PlannerCalc equals that of VisiCalc and SuperCalc, while many polls show its sales exceeding both.

MasterPlanner, its big and even more expensive brother, is a spreadsheet system and a logic file system, thus providing the advantages of both approaches.

It has two other important characteristics. In the first place, it can switch between the one and the other; and if the user edits the model in one mode, the other is automatically updated.

Secondly, PlannerCalc files are totally compatible with Master-Planner, thus providing an easy evolutionary path for the growing company.

Software compatibility dominated the Comshare approach to the financial planning market. Its next level product is FastPlan, a traditional bureau product that is now available on in-house machines. It is not as easy to use as its micro cousins, but it is more powerful and flexible, and it can use the same data files.

"PlannerCalc (or Master-Planner)," says Nigel Pendse, "is for somebody who does financial planning; FastPlan is for somebody whose job is financial planning."

But the flagship of the Comshare suite of packages is Wizard. "Wizard," Pendse explained, "is the fruit of large scale (£5m) research and development in the UK based on considerable previous experience in the field. Little of it is completely original, but it does represent a unique combination of all the best tried and tested approaches, put together in an easy to use form."

"For the future," he continued, "we believe that the total active sales life of a product like Wizard is about ten years, assuming continued and intensive R&D. We currently have more than 30 people working full-time on the development of Wizard, and this number is likely to increase in the future."

"In general, we can say that the era of dumb terminals is very near the end. All access to mainframes will soon be done via personal computers. All important user friendliness is dependent on processor power with the user, not hidden away in a remote mainframe."

"We see the future of Wizard in distributed modelling, with more and more power moving out to the micro. This theory is likely to become fact when machines with the power of the Perq come into the

market."

WALSH... "Future of financial modelling is in the ever-improving communications between micros and mainframes."

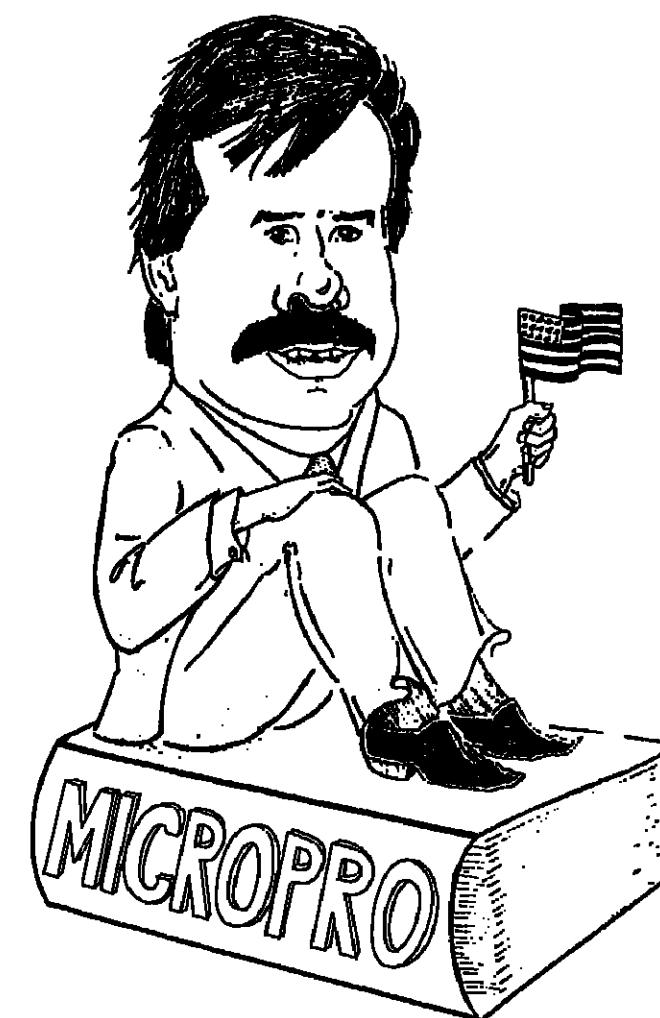
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WALSH... "Future of financial modelling is in the ever-improving communications between micros and mainframes."



BUTCHER... "To some the be-all and end-all of microcomputing."

price range of the standard PCs."

Stuart Walsh, a director within software giant MSA, sees the future of financial modelling in the ever-improving communications between micros and mainframes, and indeed different applications packages.

"Due to more sophisticated and

user-orientated software, cheaper hardware and a need for organisations of all sizes to be more responsive to change," he says, "forecasting and modelling systems are being more widely used by accountants and analysts as a day-to-day decision aid. The opportunity for planners to access computer

likely to be used by only the medium to large organisation with large data storage and retrieval requirements. One such example is D M England's Final package."

Final, like FCS and the Comshare range, can also provide data compatibility across micro, mini and mainframe hardware.

processing power directly allows planning to be a continual process rather than an annual activity."

"Within MSA we are finding that the introduction of micro-mainframe links and the ability better to communicate this improved information, using a medium such as colour graphics, is reinforcing this trend."

Graham Summers, managing director of Planning Consultancy, agrees with this general trend towards the fusion of micro and mainframe processing. But he also sees the current distinction between the logic file and spreadsheet approach continuing.

"Despite the mainframe and micro originated programs coming together on the super micros, the market for financial planning programs still seems to be dividing into two distinct sectors."

"The first sector includes the Advanced Spreadsheets which are fast and easy to use, but provide you with a lot more facilities than the original spreadsheet programs. This type of program will be used by small, medium and large organisations. Products that stand out in this field are MultiPlan, Advanced VisiCalc and 1-2-3."

"The second sector is the mainframe originated program. These will not simply be limited versions of the original mainframe product, but will be sophisticated programs in their own right providing multi-dimensional storage and retrieval facilities to delegate the system via selection menus, full screen cursor movement and scrolling, and the capacity for integration with other microcomputer products."

"This type of program is more likely to be used by only the medium to large organisation with large data storage and retrieval requirements. One such example is D M England's Final package."

Final, like FCS and the Comshare range, can also provide data compatibility across micro, mini and mainframe hardware.

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# Why Unix has become the industry's big talking point

Unix is often mentioned in the computer Press these days, but how many know the reason for this, or even what Unix is? If they know that Unix is an operating system, how many know what kind it is, and why it is so often compared with another operating system, CP/M? On these two pages MIKE BRINSFORD explains why Unix is of such

great interest to the computing community at the moment, how it came into being, what its features are, and how it relates to CP/M, especially with respect to software portability. And he discusses the ways in which Unix can be used in a commercial environment including how Data Logic has used it as a software development tool.

DATA LOGIC first became involved with the Unix System (which is more than just an operating system) about three years ago, and since then the company has evaluated it, analysed it, and put it to practical commercial use, to the extent that it now has more than 50 designers and programmers who have worked with it.

Currently Data Logic is undertaking both project work and studies involving the use of Unix for systems and software development applications. So it is in a position to try to answer the frequently asked questions for those who wonder what this Unix discussion is all about.

Unix is a Time Sharing System (TSS). Originally it ran on a variety of minis, especially PDP-11s, but now runs on 16-bit and even eight-bit micros.

The design is simple and the code compact, so the number of users who can be concurrently supported depends strictly on the hardware resources available, with few constraints from the operating system.

It is ironic that, to some people at any rate, one of Unix's rivals today is CP/M, which is a single-user, interactive system, because Unix was originally similar although it is now very much a multi-user access system.

In this sense Unix was well ahead of its time when first developed, circa 1970, when systems were always either batch (single-user, non-interactive) or TSS (multi-user, interactive).

A TSS provides a much more friendly user-interface and quicker turnaround than a batch system but unfortunately, in those days at any rate, TSSs ran on large expensive mainframes.

So Unix was begun at the Bell Telephone Labs, in New Jersey, an engineering/R&D environment, with the aim of creating a more productive programming environment than those available in the absence of a large TSS.

The author of the first version (K. Thompson) found he had personal (ie single-user) access to a little-used DEC PDP-7 minicomputer, and he first developed the interactive aspects of a TSS on it, without the multi-user access.

Unix was thus named for "uni-user Multics", after the TSS (from-runner of that time, and possibly even now).

As the original program development facilities of Unix became more popular at Bell, it soon evolved into a multi-user system, so as to make better use of the

various computers available, and to this end it became portable as well. As a result Unix is probably unique among operating systems, especially multi-user ones, in that it is over 90% written in a higher-level machine independent language, namely C (a descendant of Cambridge University's BCPL).

The early Assembler version was rewritten in C in 1973 with only a (somewhat remarkable) 30% increase in code size which included adding multiprogramming to the system. The fact that it is mostly in C gives it ease of modification as well as portability.

Unix as we know it today has thus evolved as the system's requirements changed, and as the developers of the later versions (D. M. Ritchie and K. Thompson) evolved their ideas on the design of operating systems in small computers.

So by 1974 the characteristics hoped for by its authors had become "simplicity, elegance and ease of use"; and because these hopes were essentially met (although "elegance" is in the eye of the beholder), the Unix user population mushroomed in the

various computers available, and to this end it became portable as well. As a result Unix is probably unique among operating systems, especially multi-user ones, in that it is over 90% written in a higher-level machine independent language, namely C (a descendant of Cambridge University's BCPL).

The main features of Unix are:

- A uniform system of file, device and inter-process I/O.
- Ability to spawn autonomous processes from any process.
- High degree of portability.
- System command language is selectable on a per-user basis, and is not processed by the kernel but by a user process.
- Multi-level file naming and access control system, with dynamically growable files and mountable volumes.

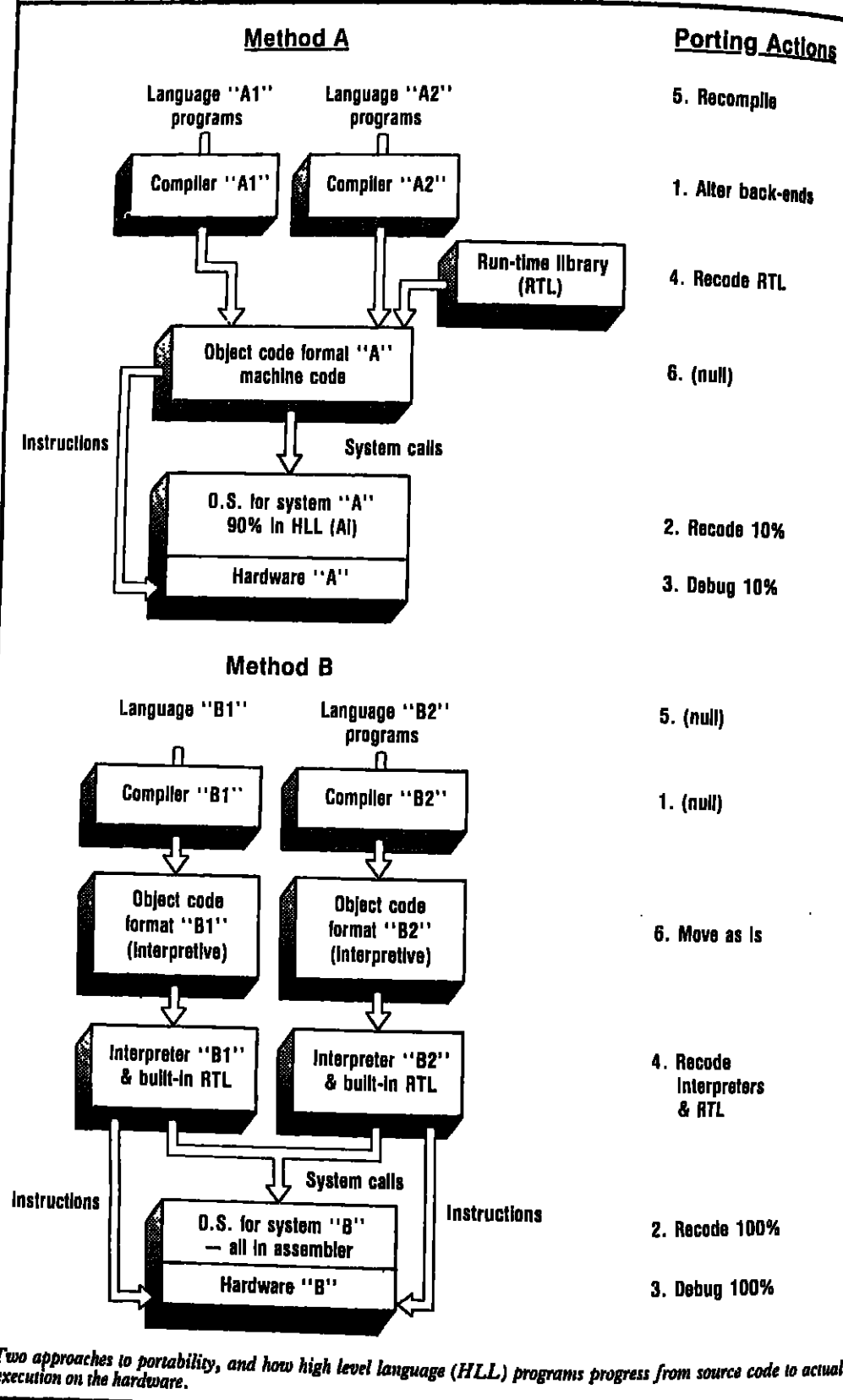
The Unix Kernel is in 3 parts, providing the following functions:

1. Process Management: process creation and (shared) program execution, swapping, process synchronization, resource allocation, process scheduling.
2. I/O System: Secondary storage "block" I/O with a cache buffer system character device I/O, access control.
3. File System: File naming, access control, disc space allocation, file sharing, "pipes" (ie inter-process communication via unnamed FIFO files).

On top of the kernel software, the subsystems which make up the bulk of the system and run as user processes include:

- (eg word processors, typesetting programs), etc; plus a large number of less useful "recreation and novelty" programs.
- In addition, in view of the environments in which Unix evolved it was gradually adapted for ease of use in experimental, real time, situations, including early computer networks.

Essentially Unix consists of a basic operating system, known as the kernel, plus over 100 subsystems which run as user processes controlled and scheduled by the kernel.



Two approaches to portability, and how high level language (HLL) programs progress from source code to actual execution on the hardware.

- Login and Logout of Terminal User.
- Output spooler.
- Shell command language interpreter.
- Assembler.
- Object code binder.
- Linking loader.
- Compilers for C, Fortran 77, Basic, Snobol, APL, Algol 68, Pascal.
- Program verifier for C programs.
- Graphics packages.
- Typesetting programs.
- Word processors.
- Syntax analyser and lexical analyser.
- Electronic mail.
- Unix-to-Unix file copy.
- "Make" - source and object code maintenance system.
- File back-up and archive.

Commercial interest in Unix began when the very cheap, very reliable, micro-chip processor arrived. Cheap, reliable, hardware is of no use without cheap, reliable, software to sell it, and Unix had become a possible source for such software as far as some entrepreneurs are concerned, at least for 16-bit micros. CP/M, the single-user operating system for eight-bit processors is another because it became the first operating system developed purely for a micro to acquire a sizeable number of Cobol and Basic commercial packages, initially for the personal computer market.

For this reason alone, although Unix and CP/M are as different as chalk and cheese, they are often linked together in the probably irrelevant but apparently burning question as to which OS will become the standard for 16-bit micros.

The first system on the second, so that the porting or conversion task is typically:

1. Alter compilers' back-ends to generate second hardware code.
2. Rewrite OS in second hardware's Assembler language.
3. Debug the OS.
4. Rewrite and debug the run-time (high level language support)

## The Unix onslaught Is their a comparable OS available for the price?

from page 22  
Two further points to notice with regard to the portability of Unix and CP/M software are that C programs written to interface to the C portable run-time library only, containing no system calls, can also be run under IBM's OS or Honeywell's GCOS; and that application packages written in Cobol or Basic to "run under CP/M" can in fact run under any system on which the interpreters can run, provided that the system provides equivalent I/O facilities and file formats to those provided by CP/M.

Therefore now that Basic and Cobol interpreters have been commercially developed for Unix and/or its derivatives, the question as to whether Unix or CP/M becomes a standard for applications on micros could soon become academic - to be superseded by "which Basic and Cobol interpreter code formats will become the standard for micro-based applications?"

Of how much use then is Unix in the commercial world to-day? First, it is a good multi-user development system that can run on mini and micro-based hardware. Secondly, Unix can provide an instant product-base for multi-user interactive system software. This is particularly true if the system being developed is general-purpose.

Data Logic has been using Unix for the last two years in the development of new software and hardware products, having evaluated Unix both as a development system, and as a possible commercial product base.

We found that Unix Version 6 at any rate, had certain deficiencies to be overcome if used in a commercial product. The most serious of these were as follows (an asterisk indicates a potential development system problem also):

1. There was inadequate error detection and prevention (eg, no file or record-sharing locks, system crashes when the maximum number of open files exceeded, files could become corrupt after an I/O error).

2. No recovery facilities, eg to do a "warm start", checkpoint a job, etc.

3. Access control to files and functions was not sufficient for some applications.

4. Unix Shell command language was not user-friendly enough for application programmers or even some system programmers.

5. There were no database management facilities, although there is nothing to prevent them being easily superimposed on the File I/O.

6. Each record accessed, in any user-imposed file organisation, required at least two disc accesses, at least three if the file is 70 Kbytes, at least four if the file is 8.5 Mbytes; this is worse if the file organisation involves intermediate

records - eg ISAM.

\*7. There was no per-user file space quota allocation/enforcement system and the systems crashed when all file space was allocated.

\*8. There was no batch job scheduler. Unix accepts as many background processes as it is given which eventually clogs the system.

9. Application program structuring problems could arise because there is no overlay facility and no program segment sharing between processes - only sharing of entire programs; the Unix solution was to make each overlay or segment a process but this increases IPC overhead.

10. The IPC (Inter-Process Communication) facilities were not adequate. "Pipes" can only be used between a parent process and its child.

The principal remedies for these problems which we adopted were first for Data Logic to write a DBMS which sits on top of the Unix file system and provides a relational database facility with five types of access path within such databases: SAM, ISAM, DAM, HRAM (Hashed-Random) and LIAM (Linked-Indexed, eg for WP).

The second remedy adopted was to use Xenix instead of Unix, which helped us overcome such major problems as file system integrity, inadequate inter-process communication, and inadequate error detection/prevention.

Using Xenix as a product-base probably saved us in the order of 25 skilled man-years when compared to starting from scratch.

Product control software, the DBMS and the initial applications are all written in C (only the most hardware-oriented pieces of special device drivers are in Assembler). Later, vertical market applications will be written in interpreted Cobol or Basic which are supplied by outside vendors.

The main problems with Unix as a development system are to do with ease of learning and, in our case (having a lot of software under development at one time) table overflow in the Kernel, C compiler, and other utilities. The latter is fairly easily overcome by recompiling the offending part of Unix, but learning to use Unix effectively presented more difficulties because of the unprofessional quality of the Unix user documentation.

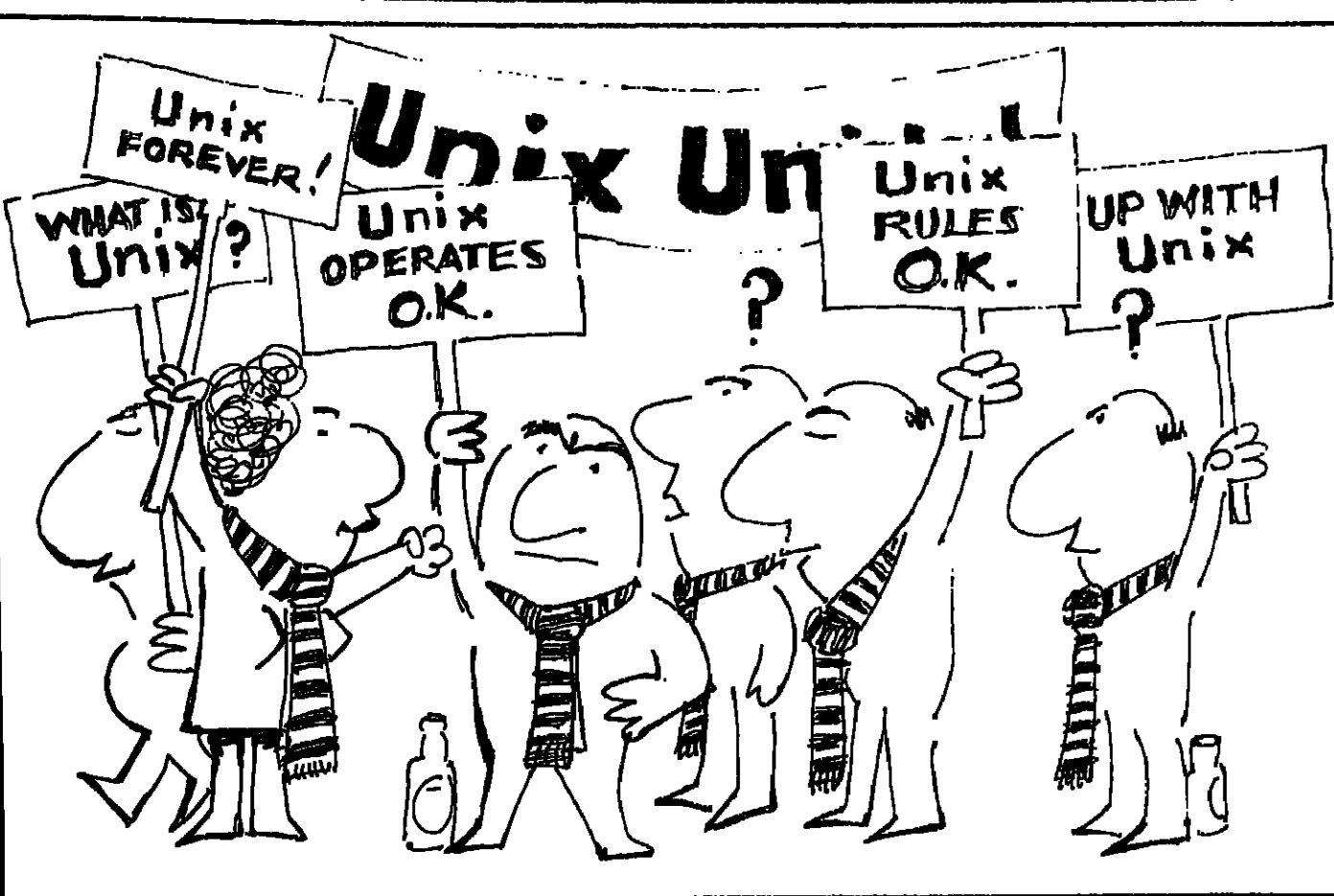
This user documentation seems to be geared to Time Sharing System buffs who are not too long out of college. However once our systems specialists had learned, by experimentation sometimes, how Unix should be used, it was relatively easy to pass this knowledge on to the application programmers.

The software MTBF was on the order of a week and the errors encountered were, either of the previously mentioned table overflow type, or very esoteric bugs.

Because of the portability of Unix-based software discussed earlier we have been able to develop products first on a PDP-11, for later transfer to other machines whenever we wish to do so.

The faults in Unix described here should not deter anyone from using it in an apt situations.

Many of the problems listed, which Data Logic first recognised in 1980, are being rectified in various quarters, and there is certainly no comparable OS available for the price, especially one which is both so well tried over time, and so easily portable.



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## CW out of tournament

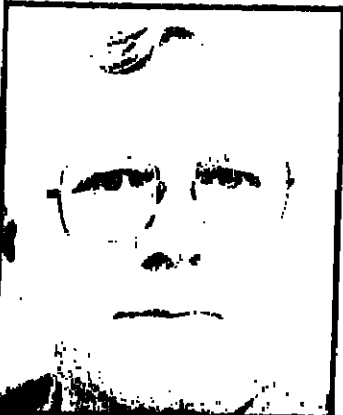
BRITISH Aerospace has knocked Computer Weekly out of the Wright Line squash tournament. Playing on their home court at Kingston, Surrey, the British Aerospace team scored a convincing 3-0 victory.

Phil Bolton, the British Aerospace number one, beat CW's Julian Bidlake 9-4, 9-2, 9-0. Simon Radley, in the number two spot, dropped the only game of the evening to the CW squad. He beat editor David Craver 9-3, 9-5, 8-10, 9-2. Stan Williams put on the finishing touches with a 9-2, 9-1, 9-1 win over Chris Prier.

CAP has formed three operating regions to strengthen its position as an international systems contractor. John Ockenden will manage the UK activities; John Ritchie is responsible for Europe and North America and Alan Benjamin will look after South-east Asia. All are CAP group executives.

David Tilsey has joined ADP Network Services as account executive for its financial district. He was previously with Comshare.

MIDS Computer Systems (UK) has appointed Geoff White (below) to the position of key account sales executive. He joins MIDS from his own business where he was selling microcomputer systems to a variety of markets. Before that he was with Control Data for five years.



Michael Roper has been appointed engineering manager at DDC. He was previously a group leader at Marconi Communication Systems. Keith Fenwick, previously a project consultant with STC, joins the company as manager, hardware development. And Michael Graham has been named marketing manager. He was formerly in marketing with DDC's parent company the M/CDC Group.

Adrian Tovey has been promoted to disc product marketing manager at Newbury Data Recording. He was formerly technical support consultant.

Computer Technology Ltd (CTL) has appointed two group managers to develop its interests and involvement in the aerospace and medical markets. Rodney Howlett has been appointed aerospace sales manager. He was formerly marketing manager at Kontron Computers. Colin Fassidge is medical systems group manager. He previously worked for Scicon as applications group manager for three years.

BIS Applied Systems has promoted three senior members of staff to principal consultants: Philip Black, who has been with the company for nine years, works at the London division; Rob Burnham of the Manchester office, has been with the company since 1976; and David Harris-White, who has been involved in the training side of BIS as well as consultancy, has been with the company for seven years.

Harris has appointed Nigel Cooper as sales executive for the company's terminal products range. He joins the firm from CMC, where he was responsible for its Reality, Sequoya and Sovereign product lines.

Neil Kelly of Case has been promoted from salesman to senior export sales manager after one year with the company, which he joined from Burroughs.

Quest International has appointed Peter Turton as director of operations. He joins the company after four years with Mini-computer Systems where he was European marketing manager.



Lynda Sable, who has been in the computer industry for 20 years, has occupied a leading role in the management team at Peterborough Software. She has been named manager, pensions systems, and will hold responsibility for the marketing, implementation, support and future developments of the company's Unipension package. She has been with the company for six years, most recently as Northern region sales manager. Her previous experience in the industry has included programming, project leading, DP recruitment and sales and marketing.

Daniel Nicholas, who joins Prime Computer, has been appointed sales executive for the Southern region of South Wales.

John Freck (below) has been appointed sales engineer, computer peripherals, by 3M's data recording products group. He was previously with word processing specialist AES Data, where he was product technical manager.



Prime Computer has appointed Brian Hamilton as areas sales manager for its South-west region, based at the company's Bristol office. He joined the company five years ago as a sales executive.

Julia Buckley, previously an internal sales engineer with Euro Electronics, has been promoted to sales office supervisor.

Following the government's approval for a new cabling of Britain, British Telecom has appointed an assistant managing director responsible for broadband services. He is Donal Wray, currently director of BT's business planning and strategy department. Wray will direct the company entry into the cable television market and promote its role in local broadband networks.

Tim Bishop has been appointed director of consultants Spicer and Pegler Associates. He was previously director of management services at Arthur Young.

## DIARY

MAY 17

The 15th Edition of the IEE Wiring Regulations, IEEIE. Lecture Theatre J002, Edward Herbert Building, Loughborough University. 7.30.

MAY 18

Demonstration of Prestel, - speaker from British Telecom. IDPM Kent branch. The Oak Room, Royal Star Hotel, Maidstone. 7.45.

MAY 25

Telecontrol of Electricity Distribution, IEEIE, The Polygon

Hotel, Cumberland Place, Southampton. 8.30.

JUNE 1

Computers in court - DP and the law, IDPM Central London branch, Altrergo, 15-19 Kingsway, London WC2. 6.00

Privacy - data protection legislation, by Michael Wood of the NCC, IDPM Sussex branch, Room G27, Mithras House, Brighton Polytechnic, Mouldecomb, Brighton. 7.00

JUNE 7

Social evening, IDPM Birmingham branch. Tickets at £3.50 are available in advance from the secretary. Buffet and skittles included in cost. Members may bring along non-members as guests. Tel: (021) 550 0375. Selly Park Tavern, Pershore Road, Selly Park, Birmingham. 7.00.

JUNE 8

Chloride Standby Systems, IEEIE, Polygon Hotel, Cumberland Place, Southampton.

JUNE 8

CONFERENCE

The Technology Transfer Society is holding a conference on flexible manufacturing systems (FMS) in London from June 23 and in Paris from June 6-7. The conference features industry and academic experts from the US, Europe and Japan, who will examine the critical issues involved in FMS implementation, including new technologies and management strategies, case studies and guidelines for selection and implementation. Details from State of the Art Ltd. Tel: 01-242 4045.

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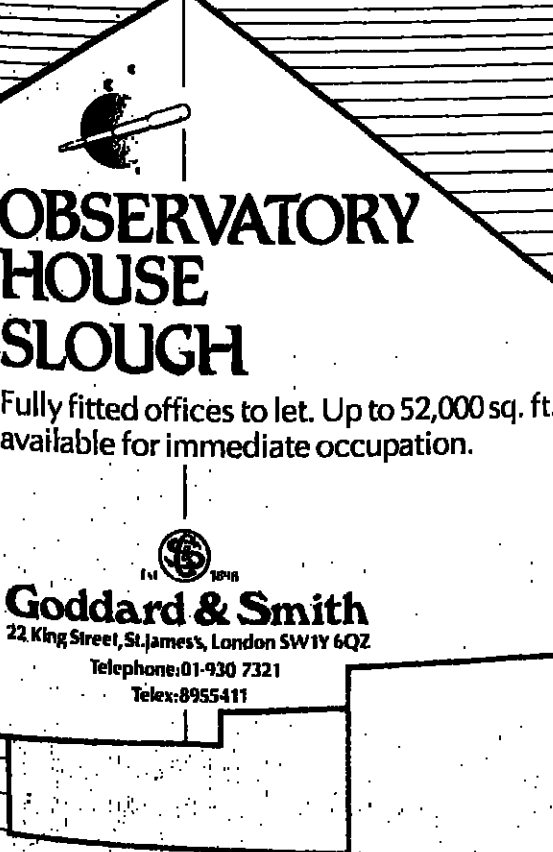
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April 1917



# COMPUTASTARS FIRST REGIONAL HEAT



Alison Grant continued her 1982 winning form, finishing 28 points clear at the end of the day.



Potential 1983 European champion? Kalamazoo's Phil Wright.



GERONIMO!

## Kalamazoo do it again—but watch the Widows

FIRST 1983 heat of the DP Olympics, sponsored again by Computer Weekly, took place at Birmingham's Alexandra Stadium over the Bank Holiday weekend. Several new or radically changed events were announced, causing a deal of last-minute hassle — but that's what Computastars is all about.

First event of the day was the return of an old favourite — throwing the medicine ball.

"But we haven't practised that," whined one team. "We've only done shot, discus, javelin and cricket ball." As old Computastars hands will tell you, the only thing you can expect is the unexpected.

Shining in the medicine ball throw was the men's team from BL Systems. Team champion Colin Worthington shared the honours in the individual competition, matching Horizon 2's number one Greg Delaney's performance exactly.

WOULD they or wouldn't they? That was the question.

Was it possible that last year's European champions, Kalamazoo, would be beaten into second place by Scottish Widows in their first Computastars appearance? It was a pretty close run thing right up until the last moment when Kalamazoo managed a victory by the slim margin of 15 points.

formance exactly.

In second place was Phil Wright, the new number one of the legendary Kalamazoo A team, last year's European champion Juff Harrison returning to the ranks.

The women's throwing result was rather as expected, Kalamazoo ladies starting a run of five victories. But it was Janet Blecker of Horizon who won the individual event in her first Computastars.

It was looking very much as if Kalamazoo was destined to walk away with the competition, but the team sprints and 100 metres

proved that this was by no means a one-horse race.

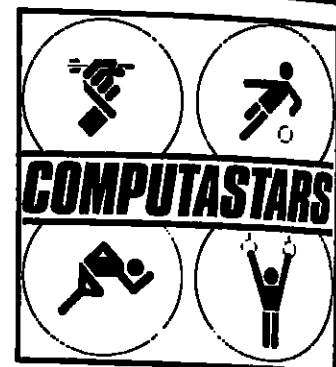
For Scottish Widows, in their first Computastars main competition (the veteran team from 1982 were back — more of them later), took the team and individual titles in these two events, sharing the former with the Open University.

But in the women's competition, all was going according to the Kalamazoo plan, the first five events going their way. After those five events, they had drawn out an unassailable lead of 53 points over second placed Bass Specialists.

But, for a time, Kalamazoo captain Richard Jephcott was a worried man.

"Who are these Scottish Widows?" he asked me, looking rather less confident than usual. "If they run a good relay, they could just about pip us at the post."

"There will be some Scottish widows if that happens!"



Sponsored by Computer Weekly.

And what was this? In the women's competition, newcomers Bass Specialists had won both the football and the jumps, but by this time Kalamazoo had a secure lead, and the ladies didn't look quite as concerned as their male counterparts.

Their confidence was rewarded by victory in the 1600 metres, and a convincing 62 point win over the Bass Specialists. Both teams go on to the UK final later this year.

At the end of the day it was a relieved Kalamazoo team which took the team and individual honours, sending two teams to the finals. But watch out for those Scottish Widows. They nearly did it this time, and the UK final promises to be just as exciting.

Report and pictures by Andrew Thomas.

# COMPUTASTARS FIRST REGIONAL HEAT



Elegant footwork from the Fisons Bass Specialists finished second in the team sprints. Team champion Carolyn Brice completes one of 40 sprints in the allotted two minutes.

## Oh!... so it's that way



Elegant footwork from the Fisons Bass Specialists finished second in the team sprints. Team champion Carolyn Brice completes one of 40 sprints in the allotted two minutes.



Scottish Widows had obviously done their homework and knew what to expect. No wonder they almost won.

## Birmingham points

MEN'S TEAMS													Total
Name	Points												
1 Kalamazoo A	30	34	40	30	36	30	37	36	273				
2 Scottish Widows	25	28	25	45	38	24	31	42	258				
3 Kalamazoo B	24	34	28	30	31	36	32	33	238				
4 Open University	20	21	26	45	38	22	24	33	222				
5 British Rail	26	24	20	30	22	29	22	45	218				
6 Fisons	28	23	22	30	25	14	34	39	215				
7 British Shoe Corp	26	32	30	30	34	22	30	21	211				
8 CSP	17	33	22	30	27	32	24	27	212				
9 Scottish Widows Veterans	24	22	20	30	25	21	34	33	209				
10 Kalamazoo C	24	32	18	30	24	34	20	21	203				
11 BL Systems A	39	22	26	15	39	14	24	30	199				
12 British Shoe Veterans	30	27	26	30	19	24	20	21	197				
13 VAG	19	28	23	30	20	21	21	21	193				
14 Horizon 1	24	19	20	15	22	32	21	18	171				
15 Fleckers SVS	21	17	20	30	20	23	16	21	168				
16 Horizon 2	27	22	25	30	22	20	13	6	165				
17 Sandvik	24	24	19	15	14	29	18	6	149				
18 Grand Met 1	15	17	27	15	19	14	23	18	148				
19 Grand Met 2	18	18	17	9	29	18	21	1	138				
20 Probe Data	30	16	17	21	15	9	20	12	140				
21 Bristol & West Soc	19	18	24	15	14	14	17	18	139				
22 Grand Met 3	17	18	15	6	14	23	18	9	120				

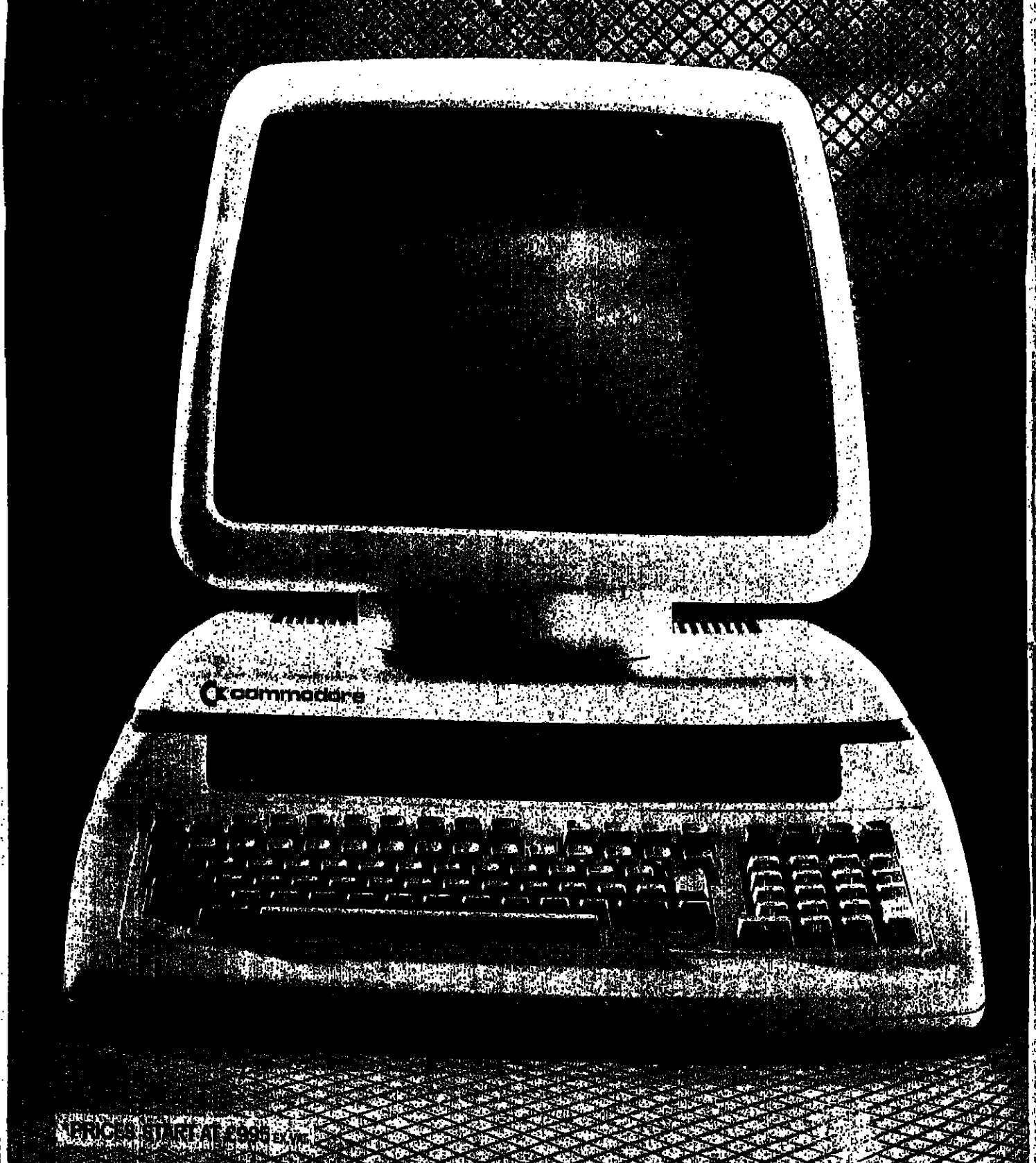
MEN'S INDIVIDUAL													Total
Name	Points												
1 Phil Wright	13	13	13	10	14	12	11	12	100				
2 Bernie Callaghan	10	10	8	15	15	9	11	14	92				
3 Malcolm Shuttleworth	9	13	9	10	9	13	11	11	85				
4 Richard Downs	10	12	10	10	11	1	11	13	78				
5 Roland Glibert	10	8	7	7	7	13	7	7	77				
6 Chris Slack	5	6	9	15	14	6	10	11	76				
7 Tim Hyde	11	12	6	10	9	14	6	7	75				
8 Colin Worthington	14	6	11	5	12	6	8	10	72				
9 Veterans	6	6	10	10	9	7	10	11	69				
10 Veterans	10	9	12	10	6	7	7	7	68				
11 Kevin Morris	5	12	8	10	7	10	6	9	67				
12 Franco Scigliano	8	9	11	10	10	1	8	10	67				
13 Greg Delaney	14	7	9	10	9	7	5	2	63				
14 Paul Yeomans	8	8	7	5	8	12	8	2	58				
15 David Harris	6	6	7	10	7	8	6	7	57				
16 Eric Gibson	7	7	7	5	7	9	8	7	54				
17 Dave Gomez	7	7	7	8	8	7	8	7	54				
18 Martin Varyard	4	6	6	10	7	7	7	7	54				
19 Paul Fagan	7	8	9	5	7	5	5	6	52				
20 Scott Watts	9	9	5	6	5	8	5	5	51				
21 Keith Williamson	8	6	5	2	6	7	9	3	46				
22 Nigel White	8	3	7	7	3	1	8	4	41				

WOMEN'S TEAMS													Total
Name	Points												
1 Kalamazoo	29	38	38	45	39	24	29	45	287				
2 Carolyn Brice	24	27	25	27	29	30	35	24	225				
3 Gillies Chervin	4	8	7	7	6	8	13	7	60				
4 Sheffield Insulating	21	16	11	21	13	23	28	21	154				
5 Horizon	18	23	12	6	19	13	8	6	105				

WOMEN'S INDIVIDUAL													Total
Name	Points												
1 Alison Grant	9	11	15	15	11	5	12	13	93				
2 Carolyn Brice	2	7	11	9	9	4	15	8	65				
3 Gillies Chervin	4	8	7	7	6	8	13	7	60				
4 Geraldine Vale	6	7	8	7	7	2	3	8	48				
5 Janet Blecker	10	10	7	2	6	8	2	2	47				

Events (left to right): Medicine ball throwing, hockey, longjump, sprints, 100 metres, football, jumps, 1600 metre relay. Scoring by Commodore Computer.

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The ability to liaise with all levels of management in user departments is of vital importance and knowledge of the ICL's ME 29 computer is essential although the Council is now developing into other compatible micro systems.

An Essential User Car Allowance is payable. Temporary housing accommodation, removal expenses, lodging allowance and/or assistance with legal costs are available in appropriate circumstances.

#### COMPUTER AUDITOR

Salary Grade: A.P.6 - £7,791 to £8,328 per annum

Applications are invited for the newly established post of Computer Auditor. This post is within the Audit Section and although the work will mainly be on Computer Audits, the successful applicant may be required to carry out other audit work.

Analysis or programming experience is essential and experience of audit work is desirable.

Temporary housing accommodation, removal expenses, lodging allowance and/or assistance with legal costs are available in appropriate circumstances.

Application forms which must be returned to the Personnel Officer by FRIDAY, 20th MAY, 1984, are obtainable from him at the Municipal Buildings, Queen Street, Bridgford, Mid Glam GP21 1LX. Tel: Bridgford (0656) 65141 Ext. 326.

GAMVASSING OF MEMBERS EITHER DIRECTLY OR INDIRECTLY WILL DISQUALIFY A CANDIDATE.

(35411)

## COMPUTER ROOM SUPERVISOR

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The position entails supervising a team of three operators on a split shift system.

Responsibility also includes maintaining standards and procedures together with monitoring the data network.

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For further details contact Mr. John Balgout or Ted Shaw on West Byfleet (01) 41188.

(3584)

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SALARY up to £12,500

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The successful applicant will be involved in liaison with customers on systems design, programming and implementation, etc. We are recruiting for both our Witham and Waltham Cross offices.

In the first instance please contact Maureen Parker on: Waltham Cross 33208, or write to her at TIPS Ltd, 2088 High Street, Waltham Cross, Hertfordshire.

(35861)

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IBM DOS VSE CICS Chief Programmer  
IBM DATABASE Administrator with IMS DB/DC  
IBM SYSTEM Programmers  
IBM 8100 DPCX or DPPX  
IBM PL/I, IMS DB/DC  
IBM DL1 Programmers with 3-4 yrs. COBOL exp.  
IBM COBOL with IMS DB/DC, some with ADF  
IBM COBOL CICS/DLI, JSP  
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ICL VME 2900 Programmers  
ICL ME29 TIME Programmers  
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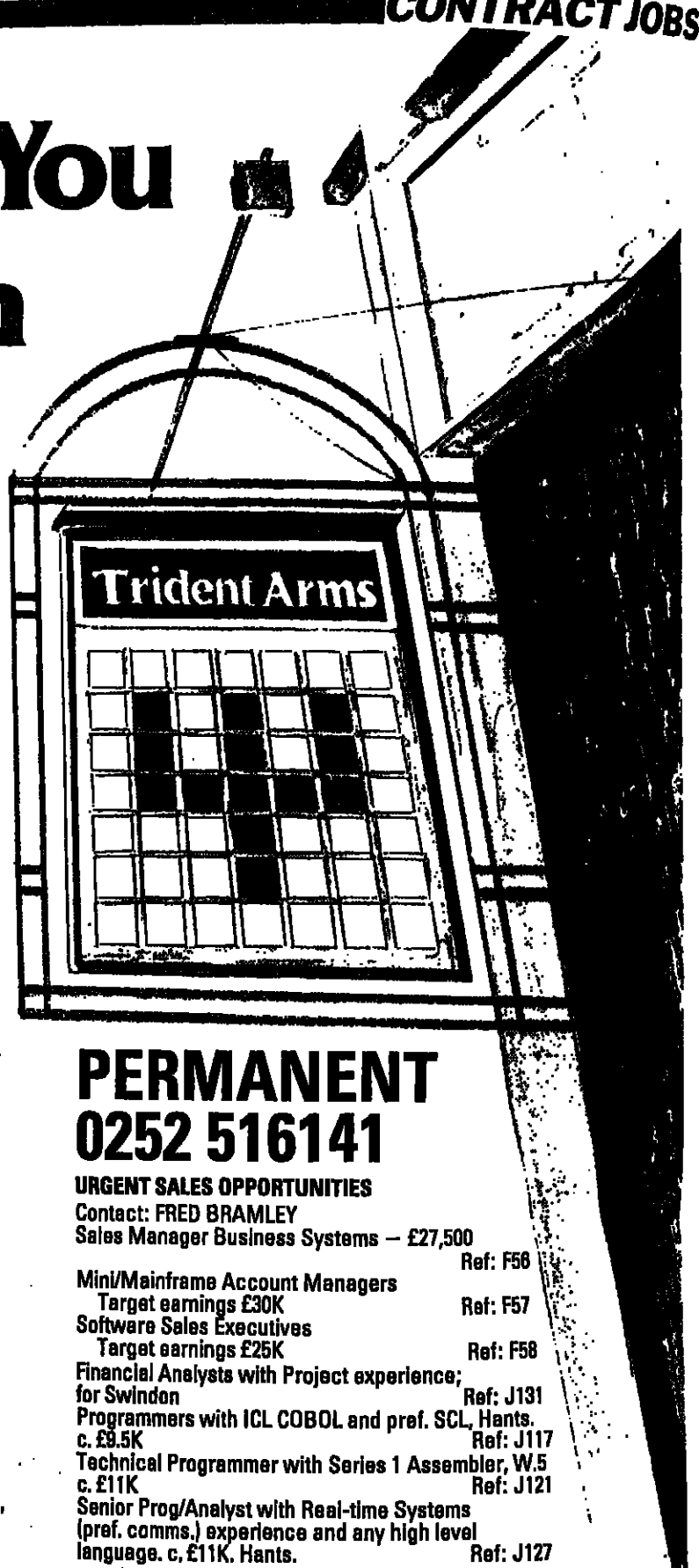
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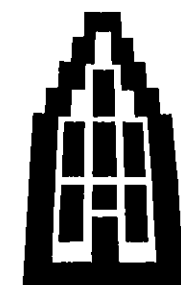
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If you feel that you are ready for a move into a new systems  
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# Senior Manager

European Software Development Group  
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In excess of  
£20,000

Executive Car

A superb opportunity for an accomplished Manager to control the development of a total software environment, within a Company whose technological excellence is recognised internationally.

South East

Our Client's reputation as an innovator in the world of minicomputer systems should be motivation enough to attract attention to this Senior Management post.

More significant, perhaps, is the exciting work being carried out by the Software Development Group in the UK, to create a powerful software environment preceding the launch of a concerted drive on a broader, commercially biased market. TP monitors; Database, Data Management and Data Dictionary Systems; Office Automation; Query Languages; Report Generators; Compilers - activity is intensifying in all areas.

We have been retained to identify the calibre of individual capable of matching the task ahead, where the successful candidate would be responsible for controlling the resources involved in taking products from conception to launch in a fast-changing and competitive environment.

Whilst the future is technically challenging, your Line Management track record - controlling the development of basic software - should indicate a vision extending beyond the purely technical.

This is a Senior and key appointment requiring energy, commitment and the diplomatic skills needed to co-ordinate international resources. Reporting to the UK Director, it is certain that you will have a major impact in continuing the Company's bright success story, on both sides of the Atlantic.

To discuss this attractive opportunity further contact Ian Goldsmid on 01 935 0671 (24 hour answering service).

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# Head of Management Information Systems

c.£30,000, Car  
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for a major retail organisation with an established household name and a turnover approaching £200m. Reporting to the Financial Director, the appointee will establish strategy and plans for the development of effective on-line and real-time computer based systems covering merchandising, distribution, financial, and marketing information needs, and will manage the dp, telecommunications (voice and data), office automation, OR and O & M functions.

The appointee must be able to identify with business management and staff at all levels, and be constructive and purposeful in solving the rapidly growing information needs of the company. Experience in managing dp systems development in a multi-site environment is essential, and a recent involvement in the practical application of modelling techniques is highly desirable.

Applicants should possess a degree or equivalent qualification in a numerate subject, and be experienced in investigating and developing systems in a commercial, manufacturing or distribution organisation with high visibility in a volume consumer or customer market.

A salary up to £30,000 will be offered plus a range of excellent benefits including a company car.

Please telephone or write for a Personal and Professional History Form to ANTHONY SPURR, Manager, Executive Selection Division, at the address below quoting reference number GW 1126.

(3574)

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BIS Applied Systems

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A number of highly experienced Business Systems Analysts with sound knowledge of retailing and distribution, and with relevant computer systems exposure are now required to spearhead this drive for new and effective systems.

These senior appointments are key to the purposeful utilisation of advanced technology in the Company. Reflecting this, the appointees will work very closely with user Directors, Managers and Staff in the investigation and definition of specific business information systems, and will be responsible for the installation and efficient use of those systems.

Applicants must possess several years Business Analysis experience in a commercial environment, and a proven ability to understand and analyse business requirements under pressure.

They should be educated to degree level or equivalent, in addition a higher business degree or accountancy qualification would be advantageous.

Starting salaries up to £17,000 plus bonuses, profit sharing and large Company benefits including car will be offered dependent upon range of experience. The successful candidates can look forward to rewarding careers in business management or in management services with one of the country's most successful commercial organisations.

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At least 5 years experience in a general commercial environment is required and qualifications in engineering or accounting would be particularly desirable. Operators and programmers must have experience of Perkin Elmer 3200 range computers running OS/32, Reliance and Cobol.

Salary levels will be commensurate with experience:

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CENTRAL LONDON: Salaries to £15K

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**PROJECT LEADERS:** Aged around 30 years and with a minimum of seven years' industrial experience, your career to date should preferably have progressed through Designer level to your current position where you have project control responsibilities. Successful candidates are likely to have current relevant experience within microprocessor systems development or the implementation of real-time industrial control and monitoring systems. In addition, you should be able to demonstrate an aptitude for proposal writing and have participated in project costing and resource management. Whilst the majority of project work is located in Central London there will be occasional U.K. site visits.

**APPLICATIONS and SYSTEMS PROGRAMMERS:** Aged 22-26 years and with a minimum qualification of H.N.D. or B.Sc. and at least one year's industrial or commercial experience. Ideally, you will have some knowledge of Intel microprocessors using PL-M as the principal programming language with PASCAL, a very useful secondary language. However, candidates who are familiar with other microprocessor systems will certainly be considered. For certain positions, it is mandatory to have an in-depth system programming knowledge of Intel's RMX operating systems and development tools. Candidates with an M.Sc. or Ph.D. are encouraged to apply if they can combine an academic background with relevant practical experience.

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## Computer Professionals

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### Systems Engineers

**London Based** £11-17,000  
A large consultancy/systems house needs staff with research or defence project experience in the areas of navigation, signal processing, underwater technology, automotive engineering, electronics or communications. Candidates should be knowledgeable about good quality software and systems design. Ref 1205/A

### RPG II/III Experts

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Highly successful systems organisation needs real experts on RPG II or III to lead various projects. Applicants must have the personality to complement their above average skills to be offered our client's above average rewards and opportunities. Ref 1205/B

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**North Hampshire** £8-14,000  
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### Analyst Progs & Systems Progs

**North West London** £11-14,000  
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**Berkshire** Approx £14,000  
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### Analyst Programmers

**London/Overseas** Up to £12,250  
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### Electronics Engineers

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(3821)

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IBM PL/1 IMS	ANALYST/PROGRAMMERS	LONDON
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For further details contact NIC POLAND TLP

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c. £9,000

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## CONTRACTS

Force Eight Computer Services is an established software house divided into three areas: Contract Recruitment, Project Management and Training.

Below are a selection of the immediate contract positions we have at present. If you are an experienced and professional contractor available or becoming available soon, or should you wish to discuss the possibility of becoming a contractor, please telephone Sandra Monks of our Resources Division on 01-680 3761 for further information or send your full c.v. which will receive our prompt attention.

**Programmer/Analysts** ICL 2900 VME/B  
**System Analysts** IDMS COBOL

We have a number of vacancies in this area all at different levels for six month contracts.

**Systems Programmers** IBM MVS/SP ASSEMBLER

**Senior Programmers** BURROUGHS 6700, 6800

**Analyst Programmers** DMS2 COBOL, GEMCOS

Five years' Burroughs experience essential for six month contracts.

**Programmers**

IBM DOS/VSE  
COBOL EASYTRIEVE

**Force Eight Computer Services**

8 Mint Walk, Croydon, Surrey, CR0 1EA.

(2690)

## Real Time Software Engineers

£8K - £12K+ Rural S. England

To maintain their position at the forefront of communication technology our client, an innovative leader in non-military high technology, requires experienced Software Engineers.

This busy team is continuing to grow - to come on board you should ideally:-

- be aged 23 - 30 years
- have an appropriate Degree/HND qualification
- demonstrate programming expertise in Assembler, Fortran, PL/M or Coral
- display an enthusiastic approach to innovation and problem solving.

For a confidential discussion of these career opportunities please call LPS on

Newbury (0635) 48709 quoting ref 797/BA or send cv to:

Larkfield Personnel Selection  
Mill Reef House,  
9-14 Cheap Street,  
Newbury, Berkshire,  
RG14 5DD.

LPS

(2690)

Holidays come around all too slowly, so when you choose your next break, or look back at your last, you consider all the factors that contribute towards a successful holiday. Much the same approach can be used to choose your next job.



**Modern Facilities:** Bright, air conditioned offices with Staff Restaurant, Bank, Travel Shop, Newsagent, and Hairdressers, all on the premises.

**Picturesque Countryside:** The Group Headquarters are in a rural setting with good car and public transport access to the woods, lakes and fields of

Leicestershire, Lincolnshire, Cambridgeshire and Northamptonshire, as well as the Cathedral City of Peterborough.

**Good, Inexpensive Accommodation:** Both in town and country: Peterborough has been carefully developed to provide pockets of well designed, low cost housing with excellent facilities, and the Thomas Cook location means you don't just have Sundays to visit the delightful villages, you can live in them!



**Social Life:** A thriving sports and social club provides exceptional facilities, with events all the year round (not just sporting) and includes your own 'pub' in the grounds.

**Sporting Variety:** Not only can you walk out of the office onto a sports field that caters for soccer, hockey, cricket, tennis, netball and bowls; you will also find that local facilities are unrivalled for sports clubs of all kinds including squash and sailing, within ten minutes' drive of the office.

**The Right Company:** A well established company with a secure future, Thomas Cook (part of the Midland Bank Group) can offer a worldwide reputation and forward thinking management.

But a job isn't just for two weeks, so you will be looking also for a stimulating technical environment (two IBM 4341's, DEC PDP 11 mini's, Apple II micro's and private Viewdata) and a company which recognises the importance of what you do.

To maintain and improve their share of the fiercely competitive markets in which they operate (Travel Shops, Tour Operations, Travellers Cheques and Foreign Money), Thomas Cook must continue to develop efficient systems utilising the most up-to-date facilities available, including Telecommunications Networks and Office Automation techniques.

To support the development of these systems they now need further Programmers, Analyst Programmers and Senior Analyst Programmers. A mix of skills is sought including programming in one or more of IBM COBOL, CIS COBOL, BASIC, AIMS, CICS, IDMS. The more senior positions will require experience of analysis and design techniques or team leadership.

However, overall Thomas Cook are looking for a flexible approach to problem solving and an awareness of the business needs of the company and for people with the potential and desire to develop their careers within a challenging and expanding environment.

The remuneration package including salaries of up to £12,500 pa, usual large company benefits and some more unusual ones, will be supplemented by generous relocation assistance where appropriate.

Telephone now, or post the coupon, and by return you will receive details of the jobs, the company, and the area, to help you choose the right move.



Please send an Application Form and Company Profile to:

0472

Position applied for \_\_\_\_\_  
Surname \_\_\_\_\_ First names \_\_\_\_\_  
Full address \_\_\_\_\_  
Home tel \_\_\_\_\_ Work tel \_\_\_\_\_ Ext. \_\_\_\_\_

**RJB MANPOWER SERVICES LTD.**

FREEPOST 24, London W1E 6JZ. Telephone: 01-439 8591 (24 hour answerphone)

**Thomas  
Cook**

THE RIGHT CHOICE FOR THE RIGHT CAREER

Def 11 min 1.30



£7,500 - £10,000

# Why we have the pulling power to attract Programmers...

A leader amongst Midlands based DP users, we have made a massive investment in hardware and facilities which now positions us to introduce international systems to a very high level of sophistication.

Massey Ferguson want to attract more DP professionals to complete a team working at the sharp end of our business management, making a personal impact on and contributing to the future of one of the largest tractor manufacturers in the Western World.

## ... Top Equipment

An IBM 3033 is linked to an even larger Amdahl V8 at our Eurocentre in Birmingham. The installation has powerful database and datacommunications facilities, on-line programming, and supports a worldwide multi-site SNA network. Our new IBM 3081 is due to be delivered and installed in the near future.

## ... Major developments

Major new on-line IMS developments are being introduced to meet the demands of an operation with a wide variety of business applications.

## ... International operations

We are working with worldwide databases, and the V8 supports a new international telecommunications network. Nearly all our future development work will have worldwide applications.

## ... Total systems integration

We are welding our manufacturing, commercial and financial systems into one of the most efficient operations of its kind in the world. Innovations such as shop floor data collection will bring dramatic improvements to manufacturing, inventory and order control.

## ... A progressive career structure

Our expanding DP environment makes career progress the norm, with development opportunities into advanced systems management, database, software, telecoms and operations management.

## Analyst/Programmer

This post will ideally suit a Programmer with at least 2 years IBM experience seeking the next logical career step, or a good solid technician with proven Analysis/Programming skills seeking a more independent and responsible role. User contact and overseas travel will be involved in developing programme specifications, testing and analysis through to the implementation stage.

## Senior Programmers

These jobs will ideally suit mature Programmers with a high degree of technical competence, leadership skills and potential for early career development.

Apart from at least 2 years IBM, COBOL and MV/OS experience we'll expect you to have had direct exposure to and involvement with IMS, DB/DC (BTS, MFS) and TSO/SPF.

## Programmers

We're looking for technically competent young Programmers with at least 12 months IBM COBOL experience to join a busy programming team working in a progressive on-line environment. A sound working knowledge of MV/OS is required and some IMS experience would be preferable.

We also have a vacancy for a Programmer with similar experience at our site in Manchester.

## WALK IN ...

We will be holding informal interview sessions in Coventry and Birmingham where you can meet and talk to our DP managers and specialists in more detail about the jobs and about our huge commitment to systems development.

The dates and venues are:

18.5.83  
Holiday Inn Hotel, Holiday Street, Birmingham.  
4.30pm-8.30pm  
19.5.83  
De Vere Hotel, Fairfax Street, Coventry. 4.30pm-8.30pm

## OR TALK IN

If you can't make the informal interview date we would very much like to talk to you over the phone. Our DP department will be available to receive your call.

Ask for Mick Brown, Programming Manager on Coventry (0203) 472005.

If you do prefer, you can write for further information and an application form to:  
Steve Milne  
Personnel Department,  
Massey Ferguson,  
PO Box 62, Banner Lane,  
Coventry CV4 9GF

## Salaries, Terms and Conditions

The salaries will be negotiable in the range indicated, according to age and experience and there are particularly attractive fringe benefits. Relocation assistance will be given where appropriate.



**DISC** DEBENHAMS INTERACTIVE SYSTEMS COMPANY LIMITED

## DATA CENTRE PROJECT MANAGER

As a progressive and expanding computer software house, we provide a comprehensive selection of computer services to an increasing range of clients. We are now seeking to recruit a Data Centre Project Manager to work at our computer installation in an attractive part of the West Country.

The responsibilities of this post will include the management of Data Centre projects, completing hardware evaluations, system implementations and the management of general developments within our Data Centre.

Preference will be given to applicants who have already acquired experience over a number of years in the computer industry at a relatively senior level and have had some experience of project management or control in a Data Centre environment.

In addition to a salary in excess of £10,000, a Company car will be provided together with other attractive fringe benefits.

Applications should be sent to:

Mr S. A. Jackman  
Personnel Manager  
DISC  
Bedford House  
Park Street  
Taunton TA1 4DB

## CONSULTANT/ANALYST PROPERTY SYSTEMS to £13,000 p.a.

Our client is a leading professional property consultancy with its head office in the West End. As part of a comprehensive range of services, our client's software consultancy department is involved with all aspects of property related computer projects from initial identification of requirements through to implementation. Demand for these services combined with development of the client's substantial in-house Hewlett-Packard installation has created a requirement for a senior Consultant/Analyst to join the existing team.

Applicants will probably be in their late twenties/early thirties and must have a proven DP background with several years analysis experience. Knowledge of property systems would be of special interest. The nature of our client's business demands that candidates must be professional in both appearance and attitude.

In return our client offers an excellent starting salary, friendly working conditions and good career prospects. If you are self motivated and looking for a challenge in a rapidly expanding environment contact Mike Harmer for details.

Apex Computer Recruitment Ltd.

404 4821

London Office:  
37 Gray's Inn Road,  
London WC1X 8TL  
Tel: 01-404 4821

Brussels Office:  
Rue de la Loi 180  
24, Uccle 1180 Brussels  
Tel: 010 322 377 4193

Senior Systems Designers/Consultants - up to £17,500 plus car

# You'll always find successful systems people in the same company: Hambro Life.

*"Where Hambro Life dares, other insurance companies usually follow."*

Daily Telegraph 16th April, 1983

*"Hambro Life set to beat home loan hitch."*

The Times 16th April, 1983

*"Hambro Life valuation - 19.5m surplus."*

Financial Times 20th April, 1983

*"Mark Weinberg, the man who shook up the British life insurance industry 20 years ago... is quietly plotting another revolution."*

The Money Observer, February, 1983

When a company's as successful as Hambro Life, it's plain for all the world to see.

If you've only read our recruitment advertising over the last few months, you will already know some of the facts:

We're the U.K.'s largest unit-linked life assurance company, with assets of over \$1.8 billion, and a market value that puts us in the top 70 companies in the U.K. A record achieved in little more than a decade!

But lately the Press has been taking a lot of interest in what the future holds for Hambro Life now that we've formed a major unit trust group, acquired Dunbar (a prestigious banking institution) and forged links with the insurance giant, Guardian Royal Exchange. On top of this, we've just launched two major new products, and are now poised to step beyond the insurance and pensions business into the financial services and expatriate markets.

Breathtaking, yes. But also impossible without the flexible integrated computer systems which are at the heart of our Administration.

This enables us to react swiftly to all market and business needs.

And with so much extra activity sweeping through the company - it means that we now have need for more top

systems professionals to join our already sizeable and formidable team:

In fact, no matter how successful you are in your present job, involvement in a future like this must attract you to Hambro Life.

We are looking for experienced systems designers and project leaders at all levels:

**SENIOR SYSTEMS CONSULTANTS**  
- up to £17,500 plus car

**SENIOR SYSTEMS DESIGNERS**  
- up to £15,500 plus car

**SYSTEMS DESIGNERS**  
- up to £14,000 plus car

The job given to you would be determined by your ability, potential and the nature of your experience. Our systems team get firmly involved in a wide range of business activities. The current project list, for example, contains immediate product development work - including our recently launched life and mortgage products, our plans for the financial services and international markets, an on-line enquiry system for what is one of the largest life assurance databases in the industry, a micro-computer and software programme for Hambro Life's

top salesmen, a personnel project and a mortgage accounting system.

## Qualities

You should be a graduate with experience in large scale systems and a record of successful implementations which reflect the high qualities required.

Systems Designers should be good at systems analysis, and user liaison, while the Senior Consultants are likely to be, at present, project managers, good at co-ordinating a multi-disciplined team (you should also be actively involved in design).

It's worth adding that while we've placed a salary figure of £17,500 on the most senior jobs - we'll happily go beyond that, providing you can show you're worth it.

On top of salary and car, all appointments carry a first-class benefits 'package' which includes non-contributory pension, free life cover, BUPA, profit sharing and share option scheme - plus generous assistance with moving to Wiltshire.

Clearly, there's a lot more to systems at Hambro Life than we can crowd into an advertisement: so if you're interested, please send for our explanatory booklet, as well as an application form, straightaway.

## Hambro Life open day!

If you're in the vicinity and would like to meet some of us in person, we will be holding a special open day on Wednesday, 25th May in the Raleigh Suite at the Tower Hotel (close to Tower Bridge underground station). Just call in any time between 10 a.m. and 9 p.m.

Either complete and return the coupon to Bob Gill, Hambro Life Assurance plc, Hambro Life Centre, Station Road, Swindon, Wiltshire SN1 1EL. Or telephone Swindon (0793) 46700 (24 hour answer-phone).

Please send me your systems booklet and an application form.

Name \_\_\_\_\_

Address \_\_\_\_\_

**HAMBRO LIFE**  
Security with a future.

Apex, no 1.50



# SYSTEMS & PROGRAMMING

**PROGRAMMERS** to £12,000

**IBM PL/1**

Major expansion within this progressive company has led to vacancies for all levels of programmers. Opportunities exist within the systems development teams for applicants with a minimum of 18 months PL/1 experience. The client is situated in Central London and retains large IBM mainframes running under MVS and VM/VSE using PL/1 Assembler, CICS and IMS.

- ★ New development projects
- ★ Emphasis on TRAINING and career development
- ★ Training in CICS and IMS

**PROGRAMMER** £10,000

**IBM COBOL**

This expanding bureau based in Central London seeks to recruit a programmer to become part of a highly successful team. Potential applicants require two years COBOL, some of which should have been gained on IBM hardware. Any TP or DATABASE experience would be an advantage, but FULL TRAINING is offered where necessary. Candidates will be involved in much client contact thus mobility and appearance are important.

- ★ Rewarding career
- ★ Variety of projects
- ★ Training in CICS and DATABASE

**PROGRAMMERS** £10,500

**ICL COBOL**

Are you looking for a challenging position that can offer you real career prospects? This well known company seeks experienced programmers to expand all of their major commercial systems. The client retains ICL 2850s and will shortly be running under VME, using TPMS and IDMS. Ideal applicants should have a minimum of 18 months ICL COBOL, together with an enthusiastic attitude.

- ★ Expanding site
- ★ Training in IDMS and TPMS
- ★ Good working conditions in a friendly atmosphere

**PROGRAMMER** £9,500

**ANY COBOL**

This new installation retains HP 3000 machines and offers an excellent opportunity for a programmer to broaden and consolidate his/her experience. Applicants must have a minimum of two years COBOL gained on any hardware, preferably in an on-line environment. The successful candidate will be offered training on HP3000, and IMAGE database. This is an interesting position offering new projects, variety and client contact.

- ★ Excellent training
- ★ Career prospects

**PROGRAMMER** £10,500

**IBM COBOL**

This prestigious firm of merchant bankers in the city can offer an exciting career move for a programmer with a minimum of 12 months IBM COBOL CICS and DL/1 experience. You should be a graduate in your 20s, ambitious and looking to progress into analysis. In return you will be offered varied financial development projects and excellent company benefits, including subsidised mortgage.

- ★ Relocation package if required
- ★ Overseas travel
- ★ Subsidised Mortgage, Pension and Life Assurance Schemes

**ANALYST** £14,000 NEG.

**IBM**

Our client, an International Insurance company with impressive offices in the city seek to recruit a high calibre DP professional, with at least two years IBM systems analysis experience. Successful candidate will work on major projects from feasibility to implementation. The company retains IBM 4331 hardware, running under DOS/VSE using COBOL CICS and DL/1.

- ★ Subsidised mortgage
- ★ Prestigious, progressive organisation
- ★ Career prospects towards management

# OPERATORS

**PDP RSX/11M OPERATORS** c. £7,800

This rapidly expanding highly successful manufacturing company seek to recruit enthusiastic self motivated RSX/11M operators with the ability to take on greater responsibility. Excellent opportunity for career development. Benefits include free life assurance, BUPA, Luncheon Vouchers, and general discounts on all company products.

**PDP RSTS/E OPERATOR** £7,000

Due to promotion an exciting opportunity currently exists within this leading international organisation. They are seeking to recruit an ambitious and enthusiastic operations professional with a minimum of twelve months RSTS/E experience, with the ability to maintain a large on-line system. The company has a policy of providing a continuous programme of career development with regular training courses arranged.

**IBM DOS/VSE OPERATORS** c. £7,500

We have urgent requirements for a selection of operators for some of the fastest growing computer companies in London and the Home Counties. If you have six months plus DOS/VSE experience, are ambitious and wish to expand your computer knowledge, call us now for further details.

**IBM OS/VS1 SEN. OPERATOR** £8,200 +

Sub. mortgage, free life assurance and BUPA cover are just part of the package offered by this well established financial organisation. Candidates should have a minimum of three years experience, preferably with some VM. Must possess leadership qualities and have the ability to take on greater responsibilities as there are rapid promotional prospects.



# ACCELERATE INTO MINICOMPUTER SALES

If you are young, enthusiastic and would like to move into minicomputer sales, we would like to hear from you.

D.R.G. Business Machines, part of the £600 million turnover *Dickinson Robinson Group*, are one of the fastest growing companies in the minicomputer market, with a projected increase in turnover of 50% during 1983.

We require people who will work hard and would benefit from COMPREHENSIVE TRAINING in this fast expanding marketplace.

Typically these opportunities will appeal to MICRO COMPUTER SALES PEOPLE and BUSINESS GRADUATES keen to establish a career with a market leader.

If you are self motivating, wish to put your career in TOP GEAR and have the potential to earn in excess of £20,000 per annum, please contact:

Mr C. Alton on 01-961 6955 (London and South East)  
Mr T. Flynn on 0934 415398 (Bristol and South West)

or write enclosing a C.V. to

**DRG**  
**BUSINESS**  
**MACHINES**

Mr C. Alton  
D.R.G. Business Machines  
Black Arrow House  
2 Chandos Road  
LONDON NW10 6UP

# An open invitation to IBM Systems Programmers

Find out about the attractive career opportunities at our Computer Centre in Harmondsworth, Middlesex. Meet some of the computing team over a drink at:  
**The Royal Lancaster Hotel,**  
Bayswater Road, London W2 (Near Lancaster Gate Underground Station)  
Wednesday, May 18, between 5.30pm and 8.30pm.

**The Sheraton Skyline Hotel,**  
Colnbrook By-Pass, Longford, West Drayton, Middlesex (Close to London Heathrow Airport)  
Thursday, May 19, between 6pm and 8.30pm.

British Telecom is expanding its computer operations and needs more experienced IBM Systems Programmers to work on a wide range of hardware and software. You will be located initially at Harmondsworth where installations include IBM 3081, 3033, 370/168, 4331 machines.

You must be educated to A-level standard and have at least 18 months experience with one of the following: MVS with Assembler, CICS, IMS, Data Communications software (TCAM, ACT/VTAM), VM/CMS, DOS/VSE, TSO/SPF, JES2.

Starting salary (including Outer London allowance) will be up to £10,300, depending on age and experience. All salaries currently under review. You'll enjoy a 5-day week, flexible working hours and all the benefits of working for a large progressive organisation that offers a sound career structure as well as scope for broadening your expertise. If you're able to come along to one of these open evenings, a telephone call to Michelle Priestley on FREEPHONE 2593 would be appreciated. If you can't make it, she will be pleased to send you further details and an application form.

British **TELECOM** Data Processing Executive



242 9796

computer recruitment limited 15 Red Lion Square London WC1R 4QH. Telephone: 01-242 9796

# Our Advanced Technology -Your Career Opportunity

## PROGRAMMER/ANALYST

DEESIDE

We are a recently-formed organisation (an Anglo-American partnership), manufacturing and developing optical waveguides to telecommunications standards. Our computer section is already expanding and we are now looking for a sound and enthusiastic man or woman to join us.

You would form an interface with the process control section and would be involved in the maintenance and development of production systems - including tracking and reporting, material planning, downtime scheduling and reporting - together with appropriate documentation updates.

You must be a graduate in a science discipline who has at least three years experience of FORTRAN on VAX under VMS (DEC PDP under RSX could be acceptable). You should have a versatile approach and must have the ability to communicate fluently at all levels.

We offer a starting salary of £8,220 and our benefits package - which reflects our progressive company policy, includes 25 days holiday, private medical insurance and assistance with relocation expenses in appropriate cases.

If you want to develop your career in a stimulating environment and in the forefront of technology then write with comprehensive career and personal details to:

Chris Atkinson,  
Project Personnel Officer, Optical Fibres,  
Deeside Industrial Park,  
Deeside, Chwyd CH3 2NX.



Aluminium Bahrain (ALBA) is the major aluminium producer in the Arabian Gulf. Established in 1969, the company now employs some 2,000 local and expatriate staff. We now seek a:

# Specialist in Process Automation

around £25,000 net of tax† BAHRAIN

The Smelter Reduction Department operates 608 electrolytic cells all of which are controlled by Modcomp IV computers.

The successful candidate will help ensure reliable operation of the present control system, plus implement improvements, by designing and writing software (Fortran/Assembler) based on established user requirements. He will also work with hardware maintenance groups to ensure high levels of reliability.

Extensive experience in on-line control systems is a requirement of the job. In addition, previous experience with Modcomp computers would be a distinct advantage. Ideally in an Aluminium Smelter or similar industry.

Earnings, at present tax free and freely transferable, will be around \$25,000 (calculated at current exchange rates) including allowances and end of contract bonuses. The position is offered on a 3 year extendable contract basis - married or single status.

In addition, substantial benefits include: 32 working days' annual leave plus 12 days' public holidays \* rent free furnished air-conditioned bungalow \* full recruitment and repatriation expenses \* annual return air fares for employee and family \* free education for children \* free medical care.

Bahrain is a stable country with a liberal government. English is widely spoken and the Company is experienced in the rapid and smooth entry of expatriate staff into the local community. Extensive sports and social facilities exist.

Please write with full details to: Mr. K. W. Rowe,  
Alba Smelter Services Limited, Standbrook House,  
25 Old Bond Street, London W1X 3TB.

## COMPUTER SYSTEMS MANAGER

Required by

THE CORPORATION OF TRINITY HOUSE

To co-ordinate and supervise the introduction of a computerised office information system throughout the Lighthouse Service organisation. Salary between £20,042 per annum and £30,878 per annum including bonus London weighting. Applicants should have a proven record of computer systems experience of at least 5 years. Knowledge of Fortran, Pascal and C++ essential. The successful applicant will be based in London but will be expected to travel to Trinity House installations throughout England and Wales. For further details and application forms apply to: The Establishment Officer, Trinity House Lighthouse Service, Tower Hill, London EC3N 4DH or telephone 01-480 6901 Ext. 288. (3653)



## Lecturer II/Senior Lecturer in Computing

Applications are invited for a post of Lecturer II/Senior Lecturer in Computing. Preference will be given to well-qualified candidates with research or development experience in computer architecture, operating systems, artificial intelligence or expert systems. Salary £8,468-£12,141 p.a. Details and application forms from the Staffing Officer, The Polytechnic, Wolverhampton WV1 1SB or Tel. Wolverhampton (0902) 710654 (ansaphone). (3642)

# Systems Engineer

— Packet-Switching Networks —

c. £13,250 p.a.

International Travel

Northern Telecom is one of the World's largest and most successful suppliers of telecommunications systems with their European and Middle East operations based in Maidenhead, Berkshire.

Following the outstanding success of our X25-based networks throughout Europe, we urgently require a network systems engineer to provide a total pre and post-sales support service to our customers on multi-million contracts.

Your background, whilst showing an appreciation of system hardware should be predominantly in the field of communications software. Ideally you are currently employed in the support or development of packet-switching networks and have worked with IBM protocols (2780, 3780) or interfacing small business systems with Viewdata or Teletex.

The role is stimulating and highly active, working with the frontiers of communications technology and allowing you to see projects from specification to final installation and beyond. Career prospects both in the UK and internationally are excellent.

For further details please telephone our Consultant Ken Allwright on Maidenhead (0628) 74274 or write to him at Charvil Lewis International, 27 Marlow Road, Maidenhead, Berks.

Charvil Lewis  
INTERNATIONAL

**nt** northern  
telecom

# THE ROGER PARKER ORGANISATION

ANALYSTS (10)		CONTRACTS	
IBM/MVS SYSTEM Progs (3)	Six month duration	Banking exp. ess.	£A.T.E.
IBM Operators (4)	COS/VSE, VM, MVS/JES	£Good rates	June 83
		£Neg	July 83
			June 83

## PERMANENTS

101 Vacancies - Defence systems, degree req., Gen., PDP, Vac boxes, RSX-11M, with one or more of the following Coral 88, Algol, Pascal, Fortran, MPS-10, Macro-11, Assembly/HL, Algol, Pascal, Fortran, MPS-10, Macro-11, £12,000+  
Anal/Prog - Banking, some travel, IBM system 34, RPG2 £12,000+  
Anal/Prog - European bank, essential PDP, AIMS, ARBAT £12,000+  
Prog/Designer - Real time scientific systems, simulation work, PDP, RSX-11M, £11,000+  
MACRO-11 £11,000+  
TEAM LEADER - Software house, developing graphic packages, Fortran prof. £AAE  
Other permanent/contract vacancies on file.

Interested? Then telephone Clive Chatlin now or write to him at:

4 LONDON WALL BUILDINGS, BLOMFIELD STREET, LONDON EC2M 5NT.  
01-588 8161

THE UNIVERSITY OF SHEFFIELD

DEPARTMENT OF COMPUTER SCIENCE

Senior Experimental Officer

Applications are invited from men and women for the above post suitable from 1 October 1983 to play a leading role in the development of laboratory facilities for the new Department of Computer Science. The successful candidate will be responsible for the day-to-day running of the department and will be expected to contribute to the development of the department's research and teaching programmes. The successful candidate will be expected to contribute to the development of the department's research and teaching programmes. The successful candidate will be expected to contribute to the development of the department's research and teaching programmes.

Research Machines microcomputer systems have a reputation for quality and innovation. Designed and manufactured to exacting standards of hardware performance and versatility, they are supported by mature, professional software, and backed by a high level of user support. As a result they are very widely used - throughout the educational sector, in scientific research, by government, and in industry.

Due to continued expansion, a vacancy exists for a technical officer in our Technical Publications group. The successful candidate will be responsible for the production and distribution of our technical publications, and will be expected to contribute to the development of the group's research and teaching programmes.

Our systems are used equally by the most experienced computer professionals and by people without computing experience. You will:

• Demonstrate a proven record of producing good user documentation

• Have a particularly attractive range of benefits including good salary, 39 hour week, 25 days paid holiday, free BUPA, life and disability insurance, pension scheme, relocation expenses.

If you are interested in this vacancy please contact Mary Chayon on Chalfont (0494) 788294 or write for an application form, quoting ref: RCM/83

RESEARCH MACHINES

CAREER OPPORTUNITY WITH LEADING BRITISH MICRO MANUFACTURER IN OXFORD

**TECHNICAL AUTHOR**

MICROCOMPUTER USER DOCUMENTATION

£7K to £12K+

Research Machines microcomputer systems have a reputation for quality and innovation. Designed and manufactured to exacting standards of hardware performance and versatility, they are supported by mature, professional software, and backed by a high level of user support. As a result they are very widely used - throughout the educational sector, in scientific research, by government, and in industry.

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RESEARCH MACHINES

App 1, no 1, 50



## Peterborough Information Technology Centre

PI TEC is one of the new nationwide network Information Technology Centres funded by the MSC and Department of Industry, and supported by the Peterborough Development Corporation and the Cambridgeshire County Council and local industry. It is part of the Peterborough Youth Opportunities Council.

PI TEC will train school-leavers in business, office, software and hardware computing, as well as providing business starter units and facilities for special interest groups, seminars and courses.

We require two managers and three supervisors:-

### Training Manager

To develop and run the training programmes of the Centre. Previous training experience in the computer field is essential.

### Business Liaison Manager

To create a bridge between PI TEC and local businesses for the placing and control of trainees in jobs and work experience, as well as obtaining projects for the Centre. A communicator with knowledge of smaller businesses is required.

### Electronic Office Unit Supervisor

To set up and run the office training side of PI TEC Ltd, which covers wordprocessing, small business software packages, office skills and PI TEC's own office work. Good typing and experience of electronic office equipment is needed.

### Software Unit Supervisor

To set up and run a computer room to provide training in computer operation and programming using a ring based on BBC machines. Knowledge of micro-computer use and programming is essential.

### Hardware Unit Supervisor

To set up and run a micro-computer workshop for training and development. A knowledge of computer electronics and design is essential.

Salaries and conditions of employment are attractive. Further details and full job descriptions from:-

# PI TEC

The General Manager  
PI TEC Ltd, c/o Peterborough Development Corporation  
Touthill Close, Peterborough

## THE LAW SOCIETY DATA PROCESSING MANAGER

£11,602-£17,412

The Law Society is the professional association of the solicitors' profession and, at present, employs a computer bureau for record keeping and related systems. A Data Processing Manager is now required to oversee the extension and development of the systems initially by way of bureau operation but transferring to an "in house" operation within two years. He/she will also be responsible for advising and supervising the development of all aspects of data processing, including word-processing, within the Society's sphere of operation.

Ideally the successful applicant will have experience in the implementation of computer projects, overall management of a small installation and will have a knowledge of data base design. He/she will be required to work closely with the bureau in setting up the data base on the bureau mainframe, and with departments of the Society in determining their needs and recommending how they should be met.

He/she will be involved in the acquisition of hardware and planning in respect of staffing and accommodation, and will subsequently be closely concerned in the arrangements leading to the acquisition of an "in house" mini computer for which he/she will assume full responsibility including the further development of the system.

Conditions of service are attractive and include 20 working days leave increasing with service to 25 days, annual salary reviews and a contributory superannuation scheme with free life assurance cover.

Depending on age and experience, an appointment will be made within the above salary range, not necessarily at the minimum.

Applications, with precise details including dates covering education, qualifications, career and salary levels, should be addressed to the Personnel Manager, The Law Society's Hall, 113 Chancery Lane, London WC2A 1PL, to arrive not later than 27th May, 1983.

(2588)

## Freelancers . . .

. . . In the North of England and Scotland who are available now or in the near future are invited to contact me, Peter Moore, to discuss a variety of interesting contract assignments. Our current requirements include analyst/programmers with:

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- MARK IV
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(2629)

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A major investor in high technology, including CAD.

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Consistent profitability and growth has been achieved by the implementation of advanced operational and management information systems. Extensive real time network supporting database systems. IBM mainframe in the Company headquarters at Slough. Current activities include the development of standard software for installation in all subsidiary companies.

### The Vacancy

An outstanding opportunity for an experienced DP professional to join the existing team. He/she will lead a team of Analysts and Programmers in the investigation, design and implementation of a variety of advanced information systems. Applicants must demonstrate proven experience in the field of project control working to formal standards and time-scales.

Reporting to the Systems Manager, the successful applicant will be responsible for all aspects of team performance, development, motivation and control.

### The Package

Starting salary of up to £14,000. Performance review after six months plus promotion to Project Manager. Five weeks' holiday. Relocation scheme where applicable. Other large Company benefits.

### To Apply

Please send full career details to the Confidential Reply Service, Ref: AEP 416, Austin Knight Limited, 66a High Street, Egham, Surrey, TW20 9BY. Applications are forwarded to the client concerned, therefore companies in which you are not interested should be listed in a covering letter.



## ONCE IN A WHILE SOMETHING EXTRAORDINARY HAPPENS

Extraordinary because Apollo Computer has achieved remarkable worldwide growth. Compared with the performance of other manufacturers Apollo has leapt ahead and a glance at the chart below will indicate a significant trend in sales and shipments driven by a market hungry for the right solution.



That market is for effective and economical workstations in scientific, engineering and computer science environments. The right solution is a price/performance ratio that brings "mainframe" power to the desks of technical professionals.

Two years ago Apollo pioneered the concept of DOMAIN processing utilising 32 bit, VLSI, high performance, virtual memory "computational nodes" each dedicated to

an individual user. Its unique feature is that it extends the "virtual memory" architecture used in many large computers across an entire local network of computational nodes, so that each user can call on resources located anywhere in the network.

DOMAIN's computing power and peripheral resources are expandable in stages that are far more affordable than upgrading a conventional mainframe. Programs and data may be shared quickly and easily across the network. The network's fault-tolerant architecture provides high overall system availability.

Each DOMAIN Node provides a virtual memory operating system, an extensive command library, and high-level language compilers. DOMAIN Nodes co-operate under a single, network-wide directory for easy access to programs, data and peripherals.

Separate windows on DOMAIN's high-resolution, bit-mapped graphics display provide "virtual terminals" connected to multiple programs and data. There is no need to wait for one program's completion before starting another. This new mode of concurrent interaction saves precious time, especially in the software development and debugging cycle.

apollo computer (uk) ltd.

### Technical Support To £16,000

For our ever growing installed base we are seeking support staff to combine their software and hardware experience in both the pre- and post-sales environment. Applicants should have broad systems experience in a technical computing environment utilising VM and graphics software preferably with a supermini manufacturer. We are also interested in hardware engineers with allied experience of software and the potential to rapidly develop in this area. The competitive package includes a salary up to 16K, choice of car, exceptional benefits and product training in America.

### Technical Sales To £27,500

To meet the demand for DOMAIN systems we are seeking successful sales people with a minimum of three years' experience with a supermini or turnkey manufacturer or bureau. The package is competitive and realistically geared to provide accelerated earnings. Initially there will be a negotiable guarantee and thereafter OTE of £27,500 are very achievable, with no ceiling on total earnings. A choice of car will be provided along with the exceptional benefits including product training in America.

For an early discussion ring our Consultant, Jeff Bowman or send your C.V. To obtain an application form simply clip and send the coupon below.

MB&A

061-228 2776



## Computer Operator

Starting Salary c.£8,500

The Development Corporation has the exciting and major task of the regeneration of the Docklands. This requires considerable effort and expertise in providing the appropriate support services for information, planning and control. In order to achieve this, the Corporation has developed automated office systems based on Prime 750 and 550 mini-computers and is currently involved in the further development of the system. We need to appoint a Computer Operator who will be responsible for the effective operation and maintenance of the computers and associated terminals. The person we are looking for, whilst

preferably having experience of Prime equipment, will have been involved in the operation of various mini-computer systems on computer-dependent sites. It is likely that the candidate will be in the age range 25-35 and educated to "A" Level standard followed by a computer studies programme. Please write in the first instance to me for an application form, David Lowman, Personnel Manager, London Docklands Development Corporation, West India House, Millwall Dock, London, E14 9YJ. We wish to move quickly on this appointment and we intend to review completed applications not later than June 3 1983.



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CONCEPTS INTO ACTION

### Programmers & Programmer Analysts

The United Nations Development Programme administers one of the world's largest multilateral funds for technical assistance to developing countries. Challenging opportunities exist for qualified programmers and programmer/analysts in the Division of Management Information Services to participate in the development of information systems in a wide range of application areas. A number of assignments of varying duration are currently available at the New York headquarters of UNDP.

Individuals selected for this programme must have the ability to work well within teams developing complex on-line systems. Languages presently used are COBOL, FORTRAN, PL/I and INQUIRE. A minimum of 5 years programming experience in one or more of the above languages as well as a university degree are required.

These positions offer an excellent compensation package. Visa and relocation assistance will be offered where applicable. Only qualified applicants will be reviewed. For consideration, please submit a detailed resume to:

Director of Personnel  
UNITED NATIONS DEVELOPMENT PROGRAMME  
One United Nations Plaza  
Room DC-1818, Dept. GW  
New York, NY 10017 USA



UNITED NATIONS  
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PROGRAMME

**Real-time scientific programming for projects so advanced, even this ad will be history by the time you've read it.**

**So please phone for an update.**

We would have liked to have told you here how international contracts and project expansion have created a range of new opportunities for Programmers and Senior Programmers in the field of aircraft and visual simulation. We would have also liked to have described how this team is making routine use of the latest 32-bit mini's and microprocessors in multi-configuration - and how they apply real-time software in the simulation of complex electronic systems and computer generated imagery. But we just haven't had time. Because the technology employed at Link-Miles is moving so fast. So instead, take our update in real-time. If you're a graduate with a minimum two years' real-time scientific programming experience, and you're ambitious, personally, technically and financially and would like to live on the South Coast, please phone Helga Clarkson today on Lancing (0903) 758881 or alternatively write to her at the address below. But be warned: once she's told you what our Programmers are achieving here, you will never be satisfied with anything else.

**Link-Miles**

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### OTHERS

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(3847)

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Due to continued expansion we now wish to appoint individuals with the necessary qualities to be successful recruiters within a sales driven environment.

The role of a Recruitment Consultant has become one of the purest forms of selling; it is both challenging and demanding, requiring a high work rate, the ability to

communicate lucidly and excellent organisational skills. You will need a positive approach to managing a sales territory, and confidence in your own ability to sell in a range of competitive situations. You should have a sales, marketing or technical background in computing, or considerable recruitment experience which should include senior or executive level appointments. You will need to be self-motivated, assertive, and determined to succeed. We offer substantial benefits, training and support to equip you fully for this fast-moving and challenging environment.

For further information, contact in total confidence:

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(BIRMINGHAM)  
David Wade on 021-236 3781  
(24 hour answering service) or  
0785 660051 (Evenings & Weekends)

(MANCHESTER)  
Sheila Bradbury on 061-833 0427  
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Manchester M3 2ER  
061-833 0427

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Belle 4, 1050 Brussels  
010 522-540 7101/71

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(3842)

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### PERQ COORDINATOR

The Computer Centre is responsible for the support of ICL PERQ Workstations in University computer centres throughout the country. As a focus for all PERQ support activities a COORDINATOR is required for two years in the first instance. Duties will include responsibility for software testing and distribution, system support, documentation, a newsletter and liaison with other sites and interested parties. The successful applicant will be a graduate, or equivalent, with several years' technical experience in a computing environment, with particular reference to small systems, application packages in BASIC, who can demonstrate organisational ability and communication skills. Initial salary is based under revised R.2003 (1980) p.e. Applications, enclosing full details, should be made by letter to the Senior Personnel Officer, Queen Mary College, Mile End Road, London E1 4NS, by May 31. (3801)

### BOX NUMBERS

Box number replies should be addressed to:  
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c/o Computer Weekly  
Quadrant House  
The Quadrant  
Buxton, Derbyshire S18 2AB

### Systems Analyst

£10,638-£12,318 PO1/2

To join one of our project teams designing and implementing systems for a wide range of Local Government applications. You will be responsible to a Senior Systems Analyst for the systems work allocated to you mainly associated with a specific Department/Service. You must have at least 2 years proven systems experience with a clear track record of achievement and an ability to get on with people at all levels. An ICL 2972 Computer under VME/8 is operated with an extensive terminals network which now includes DRS local area networking. Our conditions of service include a 35-hour flexitime week, 29 days annual leave (plus 11 statutory days), and a season ticket scheme. As one of the largest London Boroughs opportunities for career advancement are excellent.

To discuss this position informally please phone Phil Collins (Development Manager) on 01-874 8484, ext. 210 or, if you prefer, apply for an application form to the Director of Finance, Town Hall, London SW18 2PU. Tel: 01-874 8484, exts. 350/372. Closes 20 May.

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(3812)

## Freelance Database Administrator IBM-IDMS

An opportunity to work for one of our established clients as a member of a database team.

The team supports a large number of projects developed using COBOL, CICS and DOS/VSE.

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1.30



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## Project Manager

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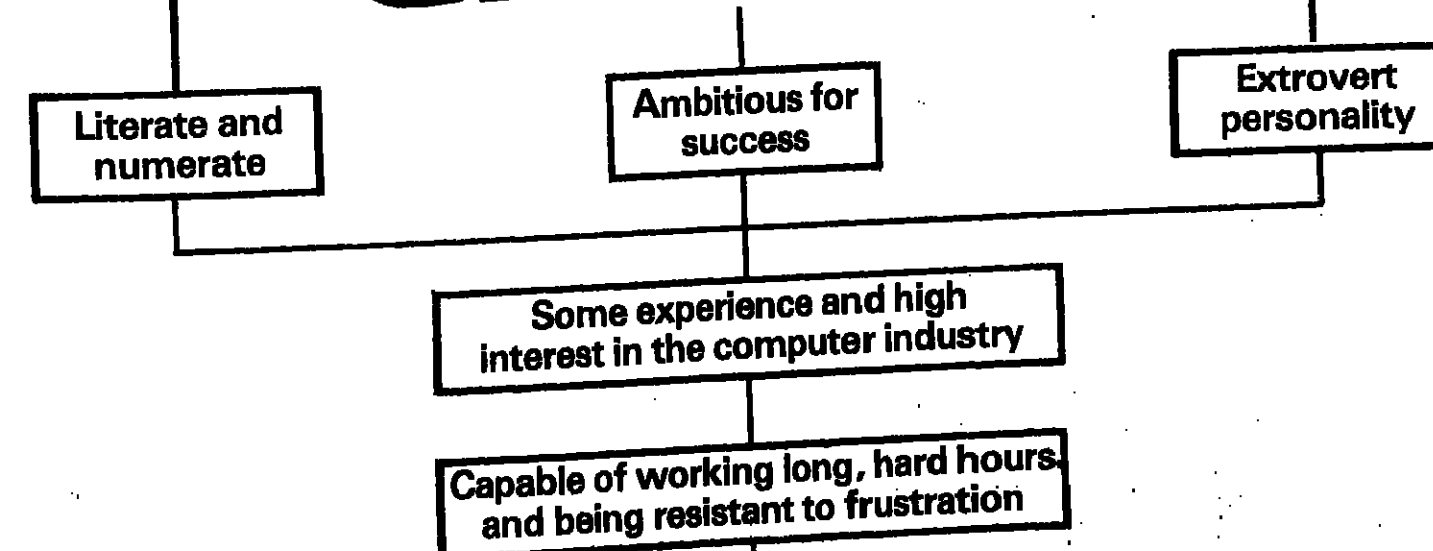
**Are you in a Managerial Pre-Sales/Technical Support Role?**  
**Have experience of Home Computers?**  
**Enjoy communicating at all levels?**

If you can answer yes to the above questions then read on. Our client, with a multi-million pound turnover, is seeking a Project Manager to head up and develop their entry into the home computer market by managing all in-house facilities and setting up field support services. The position will entail the organisation and the documentation of all technical manuals for the product, liaising with technical engineers and sales management and reporting (ultimately) directly to the Managing Director. The ability to provide seminars for the sales team and retail organisations will be required and when necessary, give assistance in presentations to major customers, co-ordinating information for advertising and PR support. Communicative skill at all levels is essential and applicants should have experience of marketing/support, software development and home computers. Included with the excellent salary and car, is a company pension scheme and a private health insurance scheme.

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CW 68/A

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E.E.C.: Pkg to £16K

A leading international Systems House and Consultancy currently requires additional Scientific Programmers and Software Designers for permanent career positions in Holland and Germany. Suitable applicants will be graduates with between two and six years' industrial experience in a real-time microcomputer or microprocessor environment. Your programming skills should include fluency in at least one high-level language preferably FORTRAN, CORAL, 6800 or PASCAL and, additionally, an Assembler. Particular hardware experience is not important, but knowledge of PDP-11/VAX, CIL mini or Motorola 6800/68000 would be a distinct advantage. For the Software Designers positions, applicants will be expected to offer knowledge of Data Communications, Networking Systems (LANs) or Process Control. Ref: L/18/A

### C & UNIX Programmers

London: Salaries to £10K

A highly respected Product Supplier is currently seeking to recruit several Systems and Applications Programmers to work on its UNIX-based range of products. Applicants, aged 22-28 years, should have graduated since 1980 with a good class honours degree in a numerate subject and have at least one year's commercial or industrial experience. Very recent M.Sc. or Ph.D. candidates are also encouraged to apply, particularly if their chosen subject matter was directly concerned with UNIX systems software. It is advantageous to be fluent in 'C' programming language and also offer PASCAL as a secondary language. Whilst the majority of programming work is undertaken in-house, candidates will be expected to work on client-sites both before or during the implementation phase. Ref: L/18/B

### Systems Designers Project Ldrs./Programmers

Southern Home Counties: Salaries to £15K

Our Client is a Systems and Software House with a well-deserved reputation for developing software and systems, engineered and packaged to the highest standards. A series of newly-won contracts has given rise to a number of vacancies for Systems Software Professionals able to deliver elegant and efficient solutions to extremely challenging problems.

For all applicants a good Honours Degree in Computer Science or a related discipline, supplemented by at least two years' experience in an industrial real-time environment is an essential requirement. Such experience will preferably include participation in the design and implementation of complex technical or systems software. Specific language skills should include fluency in FORTRAN and PASCAL, C or ALGOL supported by substantial Assembly usage. Candidates for the more senior positions must be able to show that they have the ability to lead a small team of Programmers and Designers through all phases of a Project from original Outline Specification to implementation and customer acceptance.

Current applications areas include communications networks, interactive terminal systems, graphics and on-line reservation systems. Experience in any of these fields will, therefore, be welcomed and will attract a salary premium.

Individuals who feel they meet the stringent requirements outlined above should either forward a well-documented resume to our offices or telephone one of our Consultants quoting Ref: AS/1.

### Operational Analysts

London: Salary to £13.5K

A number of Operational Analysts are required by this London based Consultancy. Academically, you should hold a first or second class B.Sc. Degree in Mathematics, Physics or Statistics. An M.Sc. or Ph.D. in Operational Research is a distinct advantage and will certainly reflect in the salary offered. Past work experience should include one or more of the following areas: war gaming and scenario studies, mathematical programming and analytical modelling, navigation systems assessments, reliability studies and data reduction. An important feature of these positions is the ability to communicate software and O.R. techniques to non-technically minded personnel. There will also be a degree of travel to clients' sites. Ref: L/18/C

### Software Development

Berkshire: Salaries to £14K

An international manufacturer and supplier of hardware and turnkey systems has budgeted to augment significantly its professional and technical personnel during 1983. Consequently, a number of outstanding opportunities exist for Software Development Engineers and Systems Implementation Consultants. Your academic and work experience must include a good class B.Sc. degree and at least 18 months' software engineering experience where office automation products are under development. In particular, your software and systems skills must have been acquired within the following areas of activity: man/machine interfacing, local and wide area networks, word processing, and electronic mail/filing applications. Programming skills should preferably include fluency in a high level block structured language and an Assembler, as a secondary skill. Ref: L/18/D

### Expert Systems

Thames Valley: Salaries to £14K

Our Client's Research Centre, established in 1978, has recently taken additional premises in the Reading area. An immediate requirement exists for persons to participate in the development of the Company's range of products and services. You are probably employed as a System Programmer, Designer or Consultant and have a minimum of 18 months' degree in a numerate subject. Those who hold an M.Sc. or Ph.D. are encouraged to apply if they can combine an academic background with some relevant industrial or commercial experience. The Company's specialist areas of activity demand that all potential employees have an in-depth knowledge of computer architecture, intelligence, cybernetics, knowledge engineering, robotics, process and control engineering. Ref: L/18/E

## TELECOMMUNICATIONS SPECIALISTS

19th MAY

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01-666 8787 (consultancies)

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Microprocessor Centre Manager Applications are invited for the post of Manager for the Swansea Microprocessor Centre. The Centre is established in the University College of Swansea and provides a service to industry and to the College. Applicants should have a degree, or equivalent qualification, together with appropriate experience with microprocessors and their applications. Responsibilities of the post include the day-to-day running of the Centre, liaison with users and the continuing development of the service. The post is suitable for a person with demonstrable technical competence who is seeking to extend and apply managerial skills. The salary will be on the scale £10,670-£13,665 per annum together with USS/USDPs benefits. Application forms (three copies) and further particulars may be obtained from the Personnel Office, University College of Swansea, Singleton Park, Swansea SA2 8PP, to which they should be returned by Friday, June 17, 1983. (2689)

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(Further advertisement)

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### BOX NUMBERS

Box number replies should be addressed to:

Box Number

c/o Computer Weekly, Quadrant House, The Quadrant, Sutton, Surrey SM6 6AS

## Senior Computing Professionals

The Information and Business Systems function of IBM United Kingdom Limited - based in Portsmouth - provides a wide range of application systems and end user services within the company. We are currently working on both distributed and host machine based systems using the latest techniques to meet the business needs of the application systems field.

We are now looking for a small group of men and women with proven leadership skills and a background in one of the following disciplines:

### Senior Analyst/Programmers

You should have a minimum of 4 years' experience in JES2, MVS, IMS and DB/DC and should be used to working under IPT. Alternatively, you could have experience of a VM/CMS distributed environment.

### Senior Analysts

You should also have had some data analysis and IMS DB design experience, working on all project phases from gathering user requirements and systems designs through to implementation of both batch and on-line systems.

### Senior Programmers

You must be skilled in PL/1, IMS, VSAM, and TSO/SPF and some experience of ADF/BTS/DB prototype would be desirable.

We offer competitive salaries supported by a generous range of benefits including BUPA membership, free life assurance and contributory pension scheme. Opportunities to develop your skills within our progressive environment are first class.

If you can match our requirements, please write with full details of your career to date, to: D.J. Dennis, Management Services Personnel, IBM United Kingdom Limited, PO Box 41, North Harbour, Portsmouth, Hants. Please quote ref: CW/41771.

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### IBM CONTRACTS

#### PROGRAMMERS - LIVERPOOL

Thorough PL1 background MFT or MVS environment. Knowledge of COBOL, TOTAL added bonus - 6 month contract. Immediate start.

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For a mixed installation ICL ME29 CTL 8000 CROMEMCO System 3 ME29 and GEORGE 2 experience essential. Knowledge of Minis and Micros an advantage.

Candidates should have had 4 years' experience, including a senior position within a ME29 installation.

Solid full details of an application form to: Mrs D. P. Pavey, Personnel Officer, Haden Place, 7-12 Tavistock Square, London WC1H 9JF. (2642)

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## MICRO PROFESSIONALS TODAY

is the first day of the rest of your career - Don't Waste It!

Modus has a long standing association with companies who are developing 'state of the art' micro technology. Accordingly we have many requirements for skilled micro professionals. Displayed below are but a few of our clients' current requirements. So if you are looking for an exciting and challenging position in the broad spectrum of 'The Micro World' it is worth giving us a call.

### Software/Hardware Development Berkshire

£12,000 to £14,000 + car

A senior role within the Support group, providing both pre and post sales support in a Z80, 8086, CPM, LAN environment. Candidates must have a good knowledge of Assembler and Operating Systems software. Preference will be given to those with good CPM experience. A dynamic, hardworking and ambitious attitude is essential. CW69/A

### Software Engineers

Milton Keynes, Bucks.

£8,000 to £10,000 + relocation

This young and ambitious company is involved in the development of micro based (Z80) business computer systems, particularly portable data capture, equipment. To support major expansion they require software engineers, preferably under the age of 30, with a degree or equivalent, plus at least 2 years computer experience.

Expertise in Assembler and a high level language plus experience of communications protocols on micro-based systems is all you need to join this youthful team developing award winning products. CW69/B

### Hardware Design Engineer

Berkshire

£11,000

Three years hardware design and micro Assembler experience are all that is necessary to join this small team developing micro-computer, video and disc products for a highly successful family of LAN micro-processor systems. Opportunities exist to move on from hardware design into other more diverse areas of the company. CW69/C

### Software Designers

Bedfordshire

to £13,000

Specialising in computer systems and terminals for the retail trade, this company is in the point-of-sale business. They successfully market and sell a range of products and services to the retail, wholesale and distributive trades. Real-time systems experience and expertise in micros and software development, together with several years Assembler programming and knowledge of Pascal or Basic would be most useful. CW69/D

### Senior Software Designer

Berkshire

£16,000

This position involves the development of communications and advanced applications software within a LAN micro-computer environment. Obviously, candidates must have solid, in-depth, real-time software design experience, preferably involving micro-processor based systems. Total commitment is essential but will be extremely well rewarded within a short time. CW69/E

### European Support Middlesex

£ as high as necessary + car

Previous sales support and in-depth CPM experience are absolutely mandatory. Previous European experience and the ability to speak French would be advantageous. Initially, this position will involve setting-up support groups, training European distributors and Pre/Post Sales Support. So candidates must be capable of coming 'on-line' very quickly. CW69/F

### Applications Programmer

Milton Keynes, Bucks.

£11,000

Our client requires an Applications Programmer with PASCAL, 'C' and Assembler experience to develop real-time system software for commercial applications. Applicants should have a minimum of 1 years experience in a similar capacity and be prepared to work in a research and development environment. Experience of personal or home computers would be an advantage, plus general enthusiasm for micro development. CW69/G

### Software Engineers

Gwent

£ High

A world leader in - COMMUNICATIONS - currently in a growth situation is offering major opportunities to ambitious dedicated Engineers. This leading independent producer of micro processor controlled telephone switching systems can offer a uniquely creative environment, where one can capitalise on talent and ideas. Engineers are being sought with the following skills: a good degree, real-time experience, a knowledge of the Motorola 68000 series, Pascal, Coral, or Assembler and a telephony background is desirable. CW69/H

### Design Engineers (Senior)

South Herts. (and U.S.A.)

to £14,000

Motorola based products, being designed by this company, are taking the Video, Audio and Film industries to new levels of production excellence. Software includes PASCAL, CPM, OS9, UNIX. Languages include PASCAL and Assembler. The target hardware centres around the Motorola 6800 family. The environment is one of Research and Development, so a preference for this type of 'atmosphere' will be satisfied. CW69/J

### Intelligent Terminal Design

Wiltshire

£ Salaries are various

Equipment currently in production is Z80 based, but development work is now being carried out on a variety of 16 bit micros. Opportunities exist for Systems and Applications Designers/Programmers and even Technicians. Authors, at a variety of levels. Apart from software programmable intelligent terminal systems, this company also produces desk top computers and business systems. CW69/K

### Software/Hardware Development Berkshire

£8,000 to £12,000

In today's world 'Energy Conservation' is vital and our client is a leader in this technology. They are concerned with the volume manufacture of control systems for heating, ventilating and air conditioning systems, and are seeking Engineers at various levels. If you have enthusiasm for micro processors, both software and hardware, and familiarity with the Intel range, these could be interesting opportunities for you to pursue. CW69/L

### Engineering Development Manager Surrey

£16,000

Candidates must be technically good and capable of managing 10 to 20 Engineers. A very good hardware background and a working knowledge of software and firmware is essential. This appointment involves taking microprocessor-based process control projects through from a conceptual level to a tangible product. Naturally, similar previous experience is essential. CW69/M

### Programmer

South Coast

£8,000 to £9,000

An excellent working environment and all the pleasures the South coast has to offer, away from the city rat-race, must be tempting to those programmers with up to 2 years experience. If you are looking for exciting, real-time project work in Control Energy Management with complete and overall involvement on a small to medium size development this could be your opportunity. Ideally, our client seeks experience of Intel 8088, using PLM 86 or Assembler 86, but 8080 or 8085 would also be considered. High level, block structured programming experience would also be highly desirable. CW69/N

### Office Automation Project

Near South Coast

£8,000 to £12,000

Very much 'state of the art' work in word processing and office automation systems. Opportunities range from Programmer to Senior Systems Design levels. Knowledge of Intel 8088 hardware and software, WP, Videotex, Teletex, OAS, etc is most desirable, but any meaningful real-time (multi-tasking) experience would be of interest. CW69/O

### H/W Project Leader

Middlesex

£12,000

An experienced Hardware Project Leader is needed to head up a project to design, develop and produce an electronic industrial monitoring and control system. Candidates must be good academically (at least a III but preferably a I) and be in their late twenties/early thirties. A knowledge of LANs, Zilog 80, LSI and MSI techniques would be most advantageous. CW69/P

If you have similar skills, but no one appointment looks exactly right for you please contact the Modus Consultants anyway to discuss other opportunities which are available, for example, in the creative world of computer games, home computers, etc.

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Modus Consultants are in London every Tuesday & Thursday - come and meet us

Copy 11/12/83



## The Hartley Cooper Group

### RPG III ANALYST/PROGRAMMERS

CITY OF LONDON  
TO £12,000

Hartley Cooper is a well-respected, medium-sized international Lloyd's insurance Broking Group.

A team of three Analyst/Programmers are now working on a major project but new work lies ahead, and we need two more members to join us. Our current location is in the City of London, but we will be moving to the City later this year.

Applicants should preferably have at least one year's experience on an IBM System/38 working on financial or business applications, you should also have a sound knowledge of RPG, be enthusiastic and prepared to work hard to ensure the success of the project.

In return you will have the satisfaction of working to high standards in a small friendly team with a genuine career opportunity to move towards project leadership. In addition to our attractive salary the Group offers four weeks' annual holiday, lunchtime vouchers, a non-contributory pension scheme, and a profit-sharing scheme.

Please apply in writing with brief cv to:  
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THE HARTLEY COOPER GROUP  
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01-823 4333 (13875)

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As London based European distributors of a unique micro-based conversion system, we need energetic, responsible staff to expand our products and services in the UK and Europe.

### SYSTEMS ENGINEER/MANAGER

We are looking for an engineer experienced in micro-computers operating under CP/M to set up and run the installation and maintenance division of our company. Knowledge is essential in communications on computerised systems preferable word processors and phototypesetters.

### SALES MANAGER

We are looking for an experienced sales person able to set up a separate National sales division with our organisation. The position demands knowledge of computerised systems, word processors and phototypesetters. The job is challenging and demanding and the successful applicant will enjoy a substantial income package plus company car and other benefits.

For further details please contact Christine Davis on 01-387 7830 (13894)

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#### IBM SYSTEM 34/38 OPPORTUNITIES

**Analyst/Programmer** **W £15,000**  
A small business systems house with good City connections in Finance is seeking an Analyst/Programmer with in depth experience of IBM System 38. A professional attitude combined with the ability to "get the job done" on your own initiative are the necessary ingredients to secure a salary up to £15K.  
Consultants Ref: 1088

**Analyst/Programmer, Analyst** **£10,000-£13,000**  
West End software house with experience in developing Computer Systems for clients on IBM System 34. Increasing development work on IBM System 38. An Analyst/Programmer and an Analyst with at least System 34 experience but wanting exposure to System 38 are urgently sought to fill positions in a small development team. Salary range from £10K-£13K.  
Consultants Ref: 1088

To obtain further information about these positions pick up the phone and call us now!

cb executive (kingston) 10

## SYSTEMS AND PROGRAMMING

**IBM/BANKING** **TO £9,000**  
International bank in Central London require an IBM COBOL Programmer with around 18 months' - two years experience, preferably in a BOS/VSE environment. You would be joining a small team developing DL/I financial systems. Excellent package includes subsidised mortgage and usual bank benefits.  
REF: C2464

**IBM SYSTEM 34** **LONDON** **TO £11,000**  
Two prestigious firms, one in Central London, one in the City, currently seek RPG III professionals to work on major development projects on IBM System 34. One position is for an Analyst/Programmer with two years' experience of RPG III in an on-line environment, to work with advertising and commercial systems, the other for a programmer with 18 months' experience preferably gained in finance or banking. Excellent prospects, opportunities to extend your analysis skills, and benefits associated with large professional organisations, including subsidised mortgage.  
REF: C3620

**DEC FORTRAN** **£8,750**  
Enthusiastic individual required for this DEC/PDP 10 on the London/Middlesex borders. You should have a minimum of 18 months' experience of FORTRAN or BASIC and be interested in moving into the DEC dept. developing on-line commercial applications to an extremely high standard.  
REF: A1435

**ICL COBOL** **BERKS** **£7,500**  
With a minimum of 12 months' ICL COBOL experience, you could be making an exciting career move and joining this large commercial company, and receive full training on the ICL ME29. Rare opportunity to increase your technical skills and join in TP systems. Full company benefit package including Pension Scheme, Life Assurance, and subsidised restaurant.  
REF: D2469

**BURROUGHS - COBOL** **£13,000**  
This expanding professional organisation, based on the Middlesex/Surrey borders is seeking Senior Analyst/Programmer and Analysts to become part of a team completing development work to an extremely high standard. You must have a minimum of two years' relevant Burroughs mainframe experience coupled with the ambition to progress. Training is offered at all levels as is the opportunity to work on a variety of applications including Accounting, Manufacturing and Banking. An excellent package is offered.  
REF: A1913

**ANALYST/PROGRAMMER** **KENT** **£9,000 NEG**  
Major commercial company housing DEC PDP and VAX equipment are currently seeking to recruit a competent analyst/programmer with two years' VMS or RSIS/E and BASIC experience to help with the workload that has been produced by the development of major new systems. You will be an integral member of the team and will be responsible for working with new systems from design to implementation. They offer excellent working conditions and company benefits including subsidised restaurant.  
REF: D2450

**IBM COBOL** **ESSEX** **TO £10,000**  
This internationally recognised engineering company require two DP professionals to join their expanding department. The ideal candidates should have two years' IBM programming background, preferably gained in a CICS and DL/I environment. You will be working in a small development team and be involved with the writing of specifications. The company retain an IBM 4341 running under DOS/VSE. This position offers excellent prospects and an impressive benefit package.  
REF: G2421

**SYSTEMS ANALYST** **ESSEX** **£11,000**  
Are you an analyst/programmer who wants to move into analysis? If you can offer 12 months' analysis experience with COBOL language, this company would like to hear from you. They are an expanding business currently retaining a VAX/VMS but will eventually be using other resources in the near future. You will be involved with systems feasibility study through to implementation. If you are looking for a challenging position that can offer good career prospects, call now for further details.  
REF: G2301

**IBM COBOL** **BERKSHIRE** **£6,500-£10,000**  
An assortment of positions are currently available in Berkshire for IBM COBOL Programmers and Analyst/Programmers with six months three years' commercial experience, gained in a DOS/VSE or VMS environment. Opportunities to gain CICS, DL/I, MANTIS, IMS experience on manual, turning, retail and financial sites. Please call for further details of these outstanding opportunities.  
REF: C23124

**MICRO PROGRAMMER** **CITY** **TO £10,500**  
Superb opportunity with internet email, investment firm in the City, offering a range of microcomputers for in-house development. You should be well educated, preferably with an accounting background, and at least two years' BASIC experience, hopefully gained on MCROS with some knowledge of Micro modeller/Supercalc or dBase II. They offer excellent prospects and a white-collar career path.  
REF: C2460

**SYSTEMS ANALYST** **CITY** **TO £14,000**  
International insurance group in the City of London require an experienced analyst with a programming background and knowledge of IBM 34 and DL/I. Insurance in the near future will be a major development area. You will be responsible for working with new technology from design through to implementation. You will be involved with the writing of specifications. The company retain an IBM 4341 running under DOS/VSE. This position offers excellent prospects and an impressive benefit package.  
REF: C2463

**ANALYST/PROGRAMMER** **CITY** **£11,000**  
International commercial company retaining IBM 4341 equipment require an analyst/programmer with two years' VMS, OS/VS and COBOL experience. You will be responsible for working with new technology from design through to implementation. You will be involved with the writing of specifications. The company offer excellent working conditions and company benefits including VLS, STL Pension Scheme and flexi-hours.  
REF: G2435



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**ICL COBOL** **SURREY** **£9,000 NEG**  
Commercial organisation based in Surrey are currently seeking competent programmers with two years' experience working with VME/B or VME 2900 and COBOL. You will be working on exciting new development projects on their ICL 2958, and will be utilizing SCL, TPMS and IDMS, in which full training will be offered.  
REF: C2466

**HONEYWELL - COBOL** **£9,000**  
This major manufacturing concern based on the London/Middlesex borders seek a competent programmer/analyst. You must have a minimum of 18 months' COBOL experience with some exposure to Honeywell mainframes. IDS and TDS background is desirable but training will be given where necessary. Applications are strongly commercial and many development. This is an excellent opportunity for an ambitious programmer to further his or her career in a challenging environment. Five weeks' holiday, BUPA and attractive life assurance arrangements.  
REF: A2021

**ICL ME29** **CITY** **TO £12,000**  
A major insurance concern, currently in the process of moving the DP department to the City, is urgently seeking ME29 programmers and analyst/programmers. Programmers should have a good understanding of the ME29, IMS and TPMS. Analyst/programmers must have worked from system design through to implementation. Any exposure to PRINTWELL is an advantage for these positions but not essential as full training will be provided. Call me now for further details or write enclosing full CV.  
REF: D23512

**UNIVAC - COBOL** **£9,000 - Mort Sub**  
Do you have 12 months' UNIVAC 1100 COBOL experience? Would you like to become involved in development work on a number of projects ranging from finance to administration? If so, my hands-based clients would like to meet you. They offer a first-class environment for you to develop your career whilst receiving training on database, online techniques and JSP. Benefits include a mortgage subsidy, (where appropriate) relocation package, bonuses and profit sharing scheme.  
REF: A1589

**IBM ASSEMBLER** **£10,000**  
This expanding bureau concern, based in the City are seeking programmers with potential to move into analysis and become part of a team completing development work to an extremely high standard. If you have a minimum of 18 months' IBM experience, preferably with some on-line and/or database knowledge, this could be the ideal career move for you. Excellent benefits, and training where necessary. Call for more details.  
REF: G2436

**GRADUATES - ANY COBOL** **TO £9,500**  
This prestigious multi-national company utilizes the latest technology to administer its manufacturing and commercial projects. To assist in furthering the development of its already highly sophisticated systems an additional programmer/analyst is to be appointed. Ideal candidates should possess a degree and have a minimum of 18 months' solid commercial COBOL experience. You will be trained on the UNIVAC 1100, and in all relevant database and on-line techniques. The attractive remuneration package includes BUPA membership and a large yearly bonus.  
REF: A1010

**JUNIOR ANALYST** **MIDDLESEX** **£7,500**  
Rare opportunity for existing Trainee Analyst or ICL COBOL programmer with at least 12 months' experience to join the corporate systems project group. The successful applicant should have good ICL COBOL, preferably with GEORGE III and VME, and some analysis experience. You will be working with a variety of systems including Payroll, Unisys and Pensions. Good company benefits including free lunches, Pension scheme and bonus scheme.  
REF: D2455

**PL/1 ANALYST/PROGRAMMER** **CITY** **£9,000 NEG**  
Financial organisation based in the City are currently seeking to recruit an Analyst/Programmer with a minimum of 12 months' exposure to PL/1. The successful applicant would have been involved with programs from design to implementation and should have some knowledge of CICS. Excellent career prospects and company benefits.  
REF: D2257

**IBM SYSTEM 38** **N. LONDON** **TO £10,000**  
I have three companies in the North London area currently seeking IBM System 38/RPG III programmers and Analyst/Programmers, who are looking for more development involvement. My clients are in the retail, manufacturing and financial fields. If you can offer a minimum of 12 months' RPG III experience, the scope for career prospects is unlimited. Excellent benefits are offered by all three companies.  
REF: G225

**HEWLETT PACKARD** **ALL LEVELS** **£ NEG**  
Whether you have 12 months' or 12 years' HP 3000 experience my client a major and expanding City based organisation would like to hear about you. Within this company you will be able to follow a career path that suits you, whilst receiving any necessary training in IMAGE, VMS, QUERY, etc. Applications are varied but include financial and sales marketing. If you would like to hear more about these posts please call me now/quote.  
REF: A1010

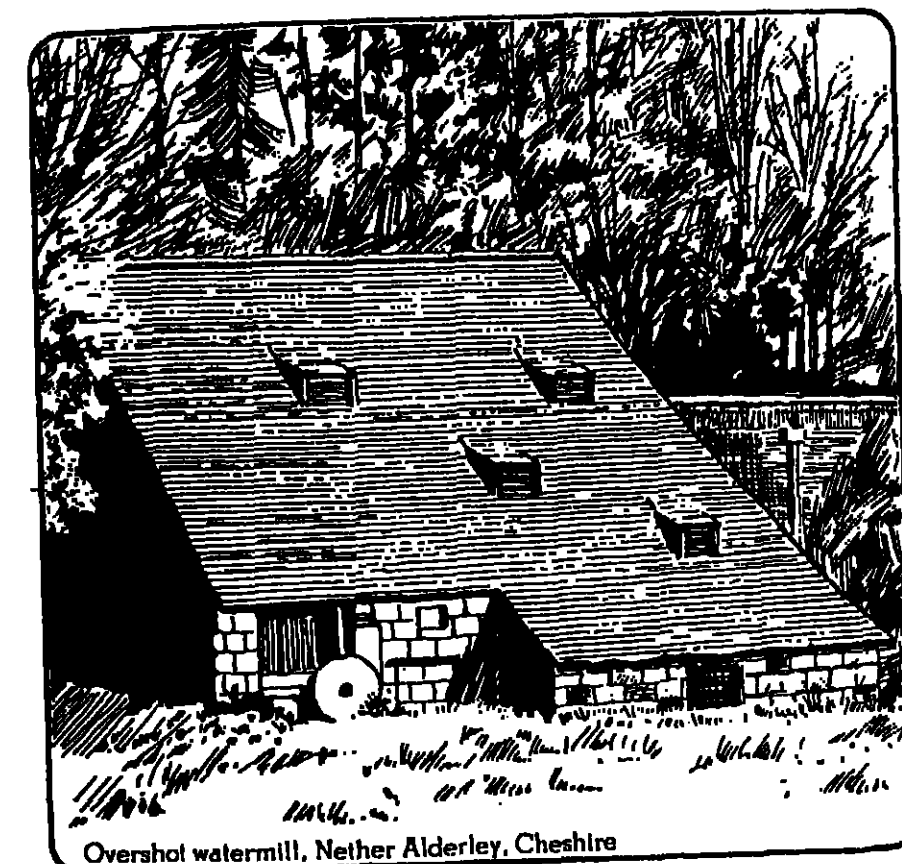
**PROGRAMMER** **HERTS** **£9,000**  
My client, a well known manufacturing concern seeks an ambitious individual with potential to move into analysis. You must have a minimum of 12 months' IBM COBOL background with DOS/VSE. The successful applicant will join an enthusiastic development team, embarking on exciting new projects. They offer attractive benefits and excellent future prospects.  
REF: G2089

**RPG III ANALYST/PROGRAMMER** **N. LONDON** **TO £12,000**  
Financial organisation based in North London require an RPG III Analyst/Programmer with at least three years' experience of programming and analysis in a System 34/38 environment, and preferably experience of finance or pension systems, to develop bespoke in-house systems, and also make some package arrangements. You will hold complete responsibility for the development of the department.  
REF: C2346

**SYSTEMS ANALYST** **MIDDLESEX** **£12,000**  
My client is a small prestigious software house in North West London and seeks a good analyst with the ability to analyse effectively and produce quality code. A programming background is preferred though not essential. A programming background is preferred though not essential. You will be working with a range of IBM System 34 and 38 machines, and will be offered excellent career prospects.  
REF: C2033



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## Systems Analyst

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**Cheshire**  
**to £13,000**  
**+ benefits**

A well qualified Systems Analyst is sought, to help in developing an integrated set of systems supporting one of the Division's Research Department.

The ultimate system will embrace a number of varied transaction processing systems linked into an Information Centre. The latter will probably run on IBM under VM/CMS and will use fourth generation data management, graphics, statistical and text processing software.

The successful applicant will be one of an energetic team analysing, designing, developing and implementing a range of facilities to meet the business needs. Initially the job holder will concentrate on setting up the databases and analysis facilities to provide Information Centre facilities.

### EXPERIENCE

We require at least three years systems analysis experience with involvement in the implementation stages of a major project. Flexibility, creativity and the ability to work as part of a team are essential personal characteristics. A science based degree and database systems experience would also be an advantage.

### BENEFITS

In addition to the salary other benefits include five weeks holiday profit sharing and bonus payments, an attractive relocation package and good career prospects.

**THE POSITION**  
Is within the Technical & Business Systems Department and there is an expanded range of systems development underway.

If you would like to discuss this opportunity in more detail please ring Tony Roberts on 0270 627206 during the day or 0270 624058 evenings and weekends, or write enclosing details to the Nantwich address.

(3808)

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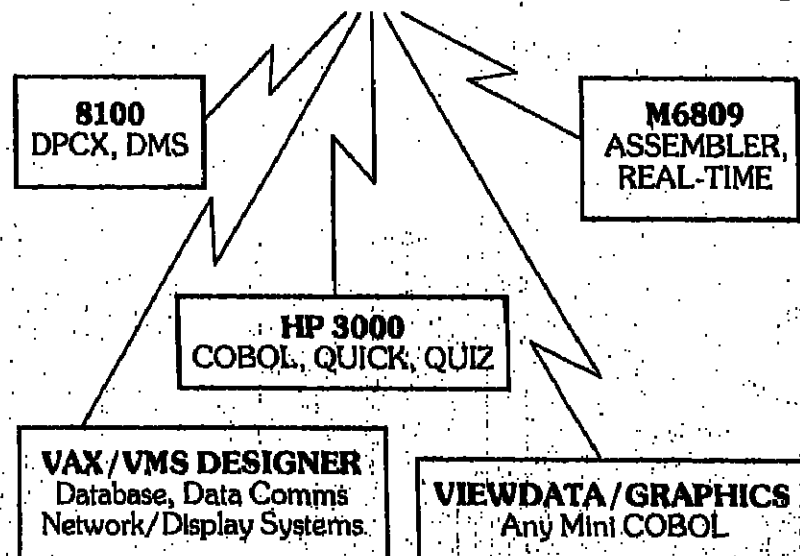
*We would like to hear from Systems 34, 38 and Series 1 people, at any level, who wish to take part in what promises to be an interesting and challenging future.*

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Link Associates Limited  
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## your appointments register

### Programmers

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COBOL/PL1/OS/CICS/IMS to £13K  
Commercial H. Counties - Midlands - Manchester

ICL/ON-LINE EXP to £12K  
COBOL Surrey

HONEYWELL to £12K  
Systems Programming experience Middlesex

DATA GENERAL ECLIPSE to £11K  
Cobol Leicesterhire

IBM/RPG2 to £12K  
Financial/Insurance Home Counties

IBM to £16K  
System exp. Essex

BASIC to £11K  
Mini Computers London

IBM/UNIVAC/COBOL to £12K  
On-line/Database Surrey

NCR 8200 to £14K  
Financial SW LONDON

### Analyst/Progs

BURROUGHS/COBOL to £14K  
Commercial Surrey

IBM 34/38 to £15K  
London/Home Counties/North

DATA GENERAL/COBOL to £11K  
Commercial Mini experience London

IBM/COBOL to £12K  
Scotland

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SOFTWARE TECHNICAL AUTHOR to £15K  
Honeywell Bull Level 84/DPS-7 Paris

PROJECT ENGINEER to £11K  
Systems/DEC Beds/Manchester

ENGINEERS to £15K  
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### Systems Analysts

IBM/ICL to £12K  
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IBM/BURROUGHS to £15K  
Commercial Accountancy London/Surrey/Manchester

IBM SYSTEM 34/38 to £13K  
Mapics/Rpg Sussex

ICL/ME29 to £16K  
Commercial Design Berks.

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Norsk Data is the rapidly expanding manufacturer of 16-bit and 32-bit superminis with our European and UK headquarters based in the Berkshire town of Newbury.  
We are expanding our R & D activity in Newbury by starting a new Data Communications Group.

### Data Communication Software Development

Salary to £14,000

This Group will work on the development and implementation of data communications software on our ND-100 and ND-500 computer systems. Their users have the most demanding communications requirements in the industry. To begin with the group will concentrate on products using X-series recommendations such as X25, X3, X28, X29 and the "coloured books", for example the Network Independent Transfer Service and the Network Independent File Transfer Protocol.

We are looking for one senior and one junior person to join the Group. The senior applicant should have University standard education. They must have some years experience in data communications, X-series recommendations and/or "coloured books". Experience with multithread programming and higher level languages is required. Besides that we want people prepared to take the initiative, develop good ideas, and with plenty of drive to follow the projects through.

For the junior position we expect a University standard education and experience with high level language and multithread programming.

This work will be rewarding because the company, the atmosphere, and the equipment are right. And there is excellent future career potential.

**Rewards**  
Besides salary the benefits are four weeks' annual holiday, BUPA membership, accident insurance, contributory pension scheme and group bonus scheme.

**Contact: Andy Peppardine**  
Tel: Newbury (0635) 35544  
Send c.v. and mark "Confidential"

Norsk Data Ltd., Strawberry Hill House, Bath Road, Newbury, Berkshire RG13 1NG

Putting people first



### LONDON BOROUGH OF HARINGEY TOTTENHAM COLLEGE OF TECHNOLOGY

High Road, London N16 4RU  
Telephone: 01-802 3111  
Principal: J. R. Parry Williams, MSc, PhD, FRES, FIDiol

### COMPUTER TECHNICIAN GRADE T.3

Required for the College Computer Unit as soon as possible. We are looking for a young computer enthusiast with suitable qualifications/experience to assist the Senior Technician in charge of the Unit with the daily routine of running the computer system. A knowledge of the use of multi-user systems in an educational environment would be an advantage. The work involved will be both diverse and challenging with opportunities for the successful candidate to be involved with software maintenance and some programming.

Salary scale: £6,570 to £7,280 per annum inclusive of London Weighting.

Application forms and further details from the Principal (OG), returnable within 14 days of the advertisement. (3633)

### PETERBOROUGH TECHNICAL COLLEGE

LECTURER II IN DATA PROCESSING required for September 1st to teach Computer Applications and Programming within the Computer Section.

Applicants should have experience in Business Data Processing and a knowledge of BASIC or COBOL would be an advantage.

Salary: £5,885-£11,022 (Burnham Technical Scale). Commencing salary will be determined by experience and qualifications.

Application forms and further details may be obtained from the Principal, Peterborough Technical College, Park Crescent, PETERBOROUGH PE1 4DZ. (3637)

### Ferranti Computer Systems Ltd.

### Software Engineers

Ferranti Computer Systems Limited, one of the leaders in high technology, is expanding its software functions at its Bracknell establishment to meet the challenge of several new military applications contracts.

We would like to hear from applicants with at least three years' experience in one or more of our application areas. Ferranti offers excellent opportunities for career advancement. Salaries and benefits are commensurate with those expected from an established company.

Our spectrum of work covers:  
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MASCOT  
Software Methodology

If your experience to date is relevant in these areas and you would like to extend your expertise please telephone our Recruitment Office on Bracknell 3232, ext. 3471 or write 5/844/CW to:

Recruitment Office  
Ferranti Computer Systems Ltd  
Western Road  
Bracknell, Berks RG12 1RA



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**Contact: Alan Williams**  
Alasdair Scott or Roger Dodd - ANY TIME! (3627)

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### COLOUR GRAPHICS DISPLAY SYSTEMS

AYDIN CONTROLS, a world leader in Graphics Display Terminals and Systems with world-wide sales in excess of \$36m during 1982, is currently engaged in a major expansion programme within the UK. This activity has created a number of new positions for sales staff with the company.

### SALES EXECUTIVES (all areas)

OQE to £20,000 + Car

At least two years' experience in selling either minicomputers, microprocessor-based systems/peripherals or related products to either Military, EU or OEM customers.

Candidates with a good technical knowledge are preferred.

In the first instance please send C.V. to Dardak Whittaker, Aydin Controls Ltd, 1 Hunting Gate, Wilbury Way, Hitchin, Herts SG4 0TA.

### Aydin Controls

### LONDON BOROUGH OF SUTTON Carshalton College of Further Education Nightingle Road, Carshalton, Surrey SM6 2EJ Telephone (011) 847 0021/7

### LECTURER (GRADE I) required September 1983

### COMPUTER DATA PROCESSING

SALARY: £5355 to £9267 plus £815 London Allowance. (Starting salary dependent on qualifications and experience)

Application forms and further particulars from the Principal of the College to whom completed forms should be returned within fourteen days of the appearance of this advertisement. (3628)

### METROPOLITAN BOROUGH OF Rochdale An Equal Opportunity Employer

TREASURER'S DEPARTMENT  
The Authority runs a variety of batch and on-line systems on a 6mb 2950 under VME 2000.

### F729 COBOL PROGRAMMER

£5,352-£9,231  
Career AP2801 with a bar at the maximum of each grade. Starting salary dependent on experience. Capable COBOL PROGRAMMER is required and preference will be given to those candidates with VME and TP experience.

### F730 COMPUTER OPERATOR

£5,002-£5,571  
Minimum of 12% per cent shift allowance. Scale 2/AP2 with a bar at the maximum of Scale 2.

Experience in operating ICL equipment is required, preference being given to those with a VME background.

Application forms available (quote ref. no.) from the Chief Personnel Officer, Rochdale 4747, ext. 663 to be received not later than Wednesday, May 19th, 1984.

### QUEEN MARY COLLEGE, UNIVERSITY OF LONDON Information Technology Lectureships

2 posts are available from October 1, in association with the newly established Centre for Information Technology.

a) Information Technology Conversion Course - with special emphasis on the design and application of information systems. Candidates should have a background in computer science and experience in commercial or industrial computing.

b) IKS Software Engineering - The Lecturer will be expected to initiate new research in the area of IKS or functional programming with relevance to the existing work in artificial intelligence and software engineering. The post carries normal teaching responsibilities and applicants should have suitable qualifications in computer science - a doctorate or equivalent research experience highly desirable.

The posts are additional to the Lectureships in Computer Science recently advertised. The Centre for Information Technology coordinates the IT activities of the Electrical and Electronic Engineering and Computer Science and Statistics Departments. These posts are attached to Computer Science and Statistics Department.

Salary scale: £5,375-£13,505 per annum (under review) plus £1,158 London Allowance. Further details and application forms available from The Secretary, Queen Mary College, Mile End Road, London E1 4NS, to be returned by May 27. (3602)

### SALES BIT

Quality of Management - 51

## Golden rules for the job interview

IT is important that a job interview is based on a formal job specification and structure that ensures both parties gain a complete insight to what they are letting themselves in for if they wish to proceed any further.

The rest of the process is generally a matter of applying your judgment to the candidates who present themselves. However, some golden rules need to be observed:

■ The interview is a two-way sell. Don't simply sit there expecting the applicant to zap it to you.

■ Start the recruitment process at the right time at least two or three months before your actual requirements. Okay, you have no real control over those who decide to leave, but often you can anticipate such intentions. There is nothing more likely to induce poor judgment than the pressure that comes from unmanaged sales territories. It tends to encourage the minimising of training and a variety of other short cuts.

■ Reference check every applicant before making the final offer. If you can do so independently, so much the better. Candidates often bend the truth. So do referees. It is easy to write the reference by dwelling on the saving graces and carefully avoiding the obvious weaknesses.

■ Get to know the applicant's domestic situation. Can it interfere with the job? A settled and supportive domestic situation can make the success of the individual salesperson.

■ Is the candidate intelligent enough to handle the job? Or so brainy that the product and market will soon become boring? A good match is most important. If the product is technical, then a numerate mind is likely to be essential as well as appropriate academic qualifications.

■ Has the candidate had substantial periods of self-employment? If so, there's a good chance he or she needs a stop-gap to "keep the wolf from the door". Once the market recovers it is very likely that the attractions of self-determination will again prove attractive.

■ Is the applicant loyal? Scanning about his or her existing company, products, boss, etc? If so, beware. There's no way one can build a good relationship with someone who lacks loyalty and integrity.

Take the time to consider what you are really looking for, what the job actually is and create an interviewing process that enables you to discover the truth about the candidate and present the realities of your company and your product.

Alan Williams

### PUZZLE ANSWER

